The Builder.

VOL. LXXV. No. 2914. DECEMBER 10, 1898.

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Incandescent Gas Lighting.

DURING the last decade a very remarkable development in the methods of utilising gas for lighting purposes has been taking place—a development which has resulted in producing a light of given intensity with less than one-fifth of the quantity of gas required by the common flat flame or argand burners, with a consequent diminution of the objectionable products of combustion—heat, carbon dioxide, and water vapour.

It has long been known that when certain substances are held in a non-luminous gas flame they will become incandescent, and emit a brilliant light without undergoing any perceptible chemical change ; and attempts were early made to utilise metallic platinum, and the oxides of calcium and magnesium, for ordinary lighting purposes. The first Welsbach mantles, however, did not make their appearance until the year 1886, and they were then so fragile that their practical utility was not very great, nor did they yield so powerful a light as those of the present day. It may, in fact, be truly said that as recently as ten years ago incandescent gas lights were little more than scientific curiosities ; whereas to-day they are used in every quarter of the globe, and number many hundreds of thousands.

The mantles now employed consist simply of oxides of certain metals, and are made by soaking a network hood of ordinary cotton in a solution of salts, which, when dried and ignited, will yield the oxides required. At the present time the Welsbach mantle is said to consist of about 98 per cent. of thoria and 2 per cent of ceria, while formerly they consisted mainly of zirconia and lanthania. The salts usually employed are the nitrates, as these are soluble in water, and when dried and ignited yield oxides.

After the cotton hood has been soaked in the solution of salts, it is passed through a wringer, dried, stretched into suitable shape, and ignited by means of a gas flame. The cotton now burns away, but leaves the metallic oxides (which were previously in solution as nitrates in the pores of the cotton mantle) in the form of the mantle. Finally this mantle of oxides is heated over a blast flame to complete the conversion of the nitrates into the oxides, and then it is trimmed into shape and "collodionised." The object of dipping the mantle into a solution of collodion or some substance of a similar nature, is to render it less liable to breakage when handled and during transport, and as soon as the mantle is placed upon the burner and a flame is applied to it, the collodion burns away and leaves the fragile network of oxides.

A remarkable fact concerning these mantles is that no pure oxide is known which will emit much light when heated in the ordinary manner, but that a second oxide, sometimes termed an "excitant," is always required. Thus, a mantle of pure thoria yields very little light, but if 1 per cent. of ceria is added to the thoria a brilliant light is at once emitted, although a mantle of pure ceria also gives very little light. Several theories have been enunciated to account for this phenomenon, but none have yet been satisfactorily demonstrated to be correct.

Another noteworthy feature is that the colour of the light emitted by the mantle varies with its composition, and to a certain extent with the temperature to which it is heated. The two principal English incandescent gas light companies are those popularly known as the "Welsbach" Company and the "Sunlight" Company ; and the thoria-ceria mantle sold by the former company emits a greenish-white light, while that of the latter, which consists of the oxides of aluminium and chromium, emits a golden-yellow colour.

Until quite recently a long glass chimney, to increase the air-draught around the burner, was a necessary adjunct to most of the incandescent gas light burners ; but a new form of burner, known as the "Kern" burner, has been introduced, which, like the Bandsept burner, requires no chimney of any description, and which will yield an illuminating power of over twenty candles per cubic foot of gas consumed per hour with an ordinary gas pressure of, say, 1½ inches.

The following table shows the claims put forward for the new burner :—

No. of Burner.	Gas Consumption in Cubic Feet with 1-in. Pressure.	Approximate Candle Power.
0	0¾	20–22
1	1¼	30–36
2	2	50–60
3	3	80–90
4	4	105–120
7	7	185–210

In practice, however, it is commonly found that a satisfactory result is not obtained with a pressure of less than 1½ in., and that the illuminating values actually obtained are about 20 per cent. lower than those quoted in the table. As the pressure increases the consumption of the ungoverned burners of course also increases, but it is usually found that a much higher value per cubic foot of gas is obtained with a 2-in. than with a 1-in. pressure. But even these less favourable figures show so great an increase in the illuminating value of coal gas that the introduction of these new burners and mantles will, without doubt, give coal gas a new lease of life as a lighting agent and strengthen its claim to rank, in towns where gas is as cheap as in London, as the poor man's light ; although it is perhaps the suburban shopkeeper who will most largely avail himself of the recent improvements.

The incandescent electric light still remains the most cleanly, convenient, and pleasant form of artificial light, and will doubtless continue to increase in popular favour as it also is improved and cheapened ; but in all towns where coal gas is cheap and water-power unavailable, the incandescent gas-light appears destined to take a leading place both as a public and a private illuminant ; for even before the new burners were introduced the incandescent gas-light was very largely used both for street lighting and for the illumination of shops and private residences, and when the expiration of patents allows uncontrolled competition in the manufacture and sale of burners and mantles, a substantial fall in prices may be expected, and an increased demand be anticipated.

There is still need for great improvement in the strength of the mantles and in the colour of the light emitted. It is true that the Sunlight mantle is less fragile, and produces a light that is less cold and less

irritating to the eyes; but, as commonly exhibited in shops, it is almost too yellow, and admits of considerable improvement. It does not, however, impart that ghastly pallor to human faces which is so noticeable in rooms illuminated with the thoria-ceria mantles.

In conclusion, mention may be made of those high-power incandescent gas lamps which have recently been introduced to compete with the electric arc lamps. In England, the Hydro-Press and the Somzee-Greyson systems are high-power systems. The pressure of the gas supplied to the burners is increased by means of water power, and when this gas under high pressure is consumed in suitable burners, the mantles, which are specially made for these burners, emit a very powerful light. It is claimed for the Hydro-Press apparatus that a light of about 500 candle-power may be obtained with a gas consumption of about 13 cubic feet per hour and a water consumption of 60 gallons per hour. It will, however, probably be found that the mantles are much more rapidly destroyed under this high-pressure system than by gas burning under the normal district pressure.

In calculating the cost of incandescent gas-light, allowance must, of course, be made for the initial cost of the burners and mantles, which, in the case of the high-pressure system, is very considerable, and also for the cost of new mantles; but it will be found that when these items have been included, the incandescent gas-light still compares very favourably with every other known form of artificial illumination in most towns supplied with coal-gas at a cheap rate.

THE ARCHITECT'S USE OF BOOKS.

TWO or three weeks ago that excellent sub-section of the Architectural Association, known as the "Discussion Section," had under consideration the subject of "The Architect's Library," on which a paper was read by Mr. Philip A. Robson, a brief résumé of which appeared in our issue of November 26 (page 485). The Editor of this Journal, as being supposed to have seen a good deal of architectural books, was honoured with an invitation to attend on that occasion in the capacity of "special visitor." The function of the "special visitor" is, we believe, to listen to the paper and discussion, and deliver thereafter such words of wisdom in regard to the subject and the discussion as he may have at his command. In the case in question the special visitor was unavoidably prevented from attending, but the following remarks may represent what he would have said if he had been present.

The point which seems to have been specially emphasised by the reader of the paper referred to was that what architects wanted were books with "more illustrations than text," and he instanced the way in which, he said, "the plates in the professional journals were studied and criticised." That represents an attitude which we have often encountered, among the younger generation of the profession especially. There are people, we know, who buy architectural journals merely to bind up the plates and throw the rest away. Now, if there were not a good deal in the letterpress which was worth something better than to throw away, a journal like this would have no right to exist at all But to leave the subject of journals, in regard to which we may be supposed to be more or less prejudiced, and take the question in its wider sense, we find the same idea again insisted on in the latter part of the report of Mr. Robson's paper. He recommended "books of reference—histories, dictionaries, encyclopædias, &c., and then books with as little letterpress in them as possible; some of the best and most useful examples of which were, he thought, the A.A. sketch-book, and the folios on the English Renaissance, by Gotch, Belcher, and Macartney." These are all very handsome books, but when we come to their characterisation as the "most useful," we may ask, in what sense "most useful"?

It is to be feared that the real answer is that they are the most useful to "crib" from. That perception, consciously or unconsciously, is at the bottom of all this desire for books with many illustrations and "very little text." The "Architectural Association Sketch Book" is a mine of wealth for this purpose; and that, we imagine, is also the principal value set on the various folio publications illustrating the architecture of the English Renaissance, to which reference was made in the same sentence. The English Renaissance is in fashion at present, and here are books full of large plates of buildings reproduced from photographs, directly at hand to copy details from. Our own impression of the largest of these works was, we must confess, one of disappointment. We expected a collection of measured drawings and a history, and we received what was mainly a collection of photographs. But the publisher was wise in his generation, and offered the architects what they seemed to want—originals to copy from. Mr. Blomfield's octavo book on the English Renaissance, which has more text than illustrations, and no large plates, is a much more valuable book than any of these, because it does not merely give examples, but throws new light on the whole history and meaning of the English Renaissance.

All this attitude towards architectural books—this desire for much illustration and little text, is only one instance of the fact that our younger generation of architects are leaning towards a wrong and one-sided view of their business, and regarding it as their principal end to produce picturesque buildings, founded more or less on the forms of older architecture. All this production of books with "more illustrations than text" only serves to foster and encourage this habit of imitative architecture.

The value of books on architecture which are mainly illustrative is of two or three kinds. They serve to extend our knowledge by bringing before us illustrations of buildings which we may never be able to see. They serve as memorials of buildings which may be in a state of decay, or may for other reasons have to be removed. A monograph which forms a complete illustration and analysis of a great building in all its parts, such as Salzenburg's "Saint Sophia," forms an important lesson in architecture. So also does Mr. Penrose's book on "Athenian Architecture," which we fear would be despised by many of the younger school as presenting no picturesque plates—nothing to "crib" from; but which is a summary of real and special knowledge on a great subject. But mere collections of sketches, picturesque illustrations, and photographs, teach very little. Rightly used, they may be a means of stimulating the imagination. But they are painfully likely to lead the young architect only to substituting other people's imagination for his own.

Architecture is not only a matter of taste but a matter of knowledge; and the demand for knowledge of all kinds in connexion with it is increasing. To find recommendations for an architectural library to be chiefly composed of illustrations shows how little this fact is realised. Among the most valuable and necessary books for the architect's library are not the show books, which are delightful to look at but which carry with them the temptation to copy, but the books of solid information on such subjects as foundations, roofing, drainage, ventilation, and a score of other things, without a knowledge of which the architect's admiration of the picturesque of ancient buildings will not do him much good. Such a book as Gwilt, though its illustrations are of a most formal and little attractive kind, is what we call a real architect's book *par excellence;* and we recommend a little more attention to that kind of book in forming an ideal architect's library, bearing in mind that architecture implies not only taste but knowledge—and a great deal of it. Select your library accordingly.

NOTES.

Commercial Education.

WE are glad to see that, in his address last week on the subject of commercial education, Lord Reay, the Chairman of the London School Board, dwelt upon the absolute necessity of a good preparatory education. "They would not succeed," he said, "with any specific commercial school they intended to start unless they had preparatory schools in which a general education was given such as would develop the mind and talents of those who would in the future deal with commercial problems." The truth is that a good, sound, modern education should be the best of all preparations for successful commercial life. This fact we have insisted on in regard to technical education, the foundation of which must be an effective system of elementary education. After all, what have young men to do in commercial and business life but use a well-developed intelligence, and the subjects which they should have studied under any satisfactory system of secondary education? A good handwriting, book-keeping, geography, modern languages, political economy, are the kind of subjects which go to constitute a commercial as well as a good secondary education. The question of commercial education, as Lord Reay said, must be kept separate from technical education; they are distinct. We are inclined to think that if there were a uniform and satisfactory system of secondary education in this country, there would be less need for what is called commercial education as a thing by itself.

The London County Council and Parliament-street Improvements.

THE recommendation that the London County Council do not contribute to the widening of Parliament-street, except to spend 12,000*l.* on the roadways, seems to be perfectly justifiable. The Office of Works

has stated, that such a scheme as has now been begun could be carried out without loss, and it has not been shown by the Government that this will not be the case. The application to the County Council to contribute a very large sum towards the improvement is very much in the nature of "a try-on" by the Treasury. That the County Council might well have contributed if a loss had been likely to occur, we do not know; but even then it would not have altogether been equitable to have asked this body, representing the London taxpayers, to contribute to an improvement, in regard to the carrying out of which they have had no voice. Londoners are by no means satisfied with the way in which Government buildings are erected, and if they are to pay any part of the piper they have a right to a voice in dictating the tune. To ask the ratepayers of London to make the Government, so to say, a present of a few hundred thousand pounds is, therefore, somewhat unreasonable.

The Fire in New York.

THE news of the destruction by fire of the premises of the Home Life Insurance Society in New York, one of the modern high buildings constructed of steel framing and stone or terra-cotta casing, came with a curious irony the same day as the reading of a paper at the Institute of Architects on this class of building as exemplifying "American fireproof construction." The accounts which we have of the disaster from the American correspondents of London papers are oddly conflicting. One account states that it "burned like tinder," which we should think quite impossible considering the materials of which the building was probably mainly composed; another account says that the results showed the fire-resisting power of the structure, as the stories from the eighth to the fourteenth were "destroyed" without any material damage to the building below the eighth story. All accounts seem to agree that the great height of the building added a new fire-risk, from the impossibility of the firemen's hose reaching the flames. It will be interesting to know what the real facts are. We have always believed that these exceptionally high buildings, of whatever material composed, would be very dangerous in case of fire.

The Church of the Sacré Cœur, Paris.

IT is announced that the cupola of the Church of the Sacré Cœur at Montmartre, Paris, will be completed for the year 1900. Two-thirds of the work is done, and the summit of the cupola will be reached in the course of next year. The progress seems in reality to be absurdly slow, we presume owing to difficulty in collecting funds. After the completion of the dome, which will be surmounted by a stone cross, five or six months will be spent on the interior decoration; and after the removal of the scaffolding the church, which is very dark at present, will receive a flood of light from the twenty windows of the dome. There will then remain, it is estimated, another three years' work in the erection of the campanile on one side, and the sacristy and presbytery on the other; and there is also another tower to be built, of specially solid design, to receive the great bell called "La Savoyarde." The work was commenced in June 1875, and has cost twenty-four million francs up to this date; its completion will require another six millions.

Illustrations of Constantinople.

AT the meeting of the Architectural Association Discussion Section last week, Mr. Henderson, who has been for some time engaged in making studies of the architectural remains of Constantinople, gave a talk on the subject which derived additional interest from the number of drawings and photographs with which it was illustrated. Saint Sophia has naturally received special attention, and some fine coloured drawings of various portions of the interior and of the detail were exhibited; but Mr. Henderson has also been making measurements and a restoration of the exceedingly interesting fifth-century walls of Constantinople, of which large portions are left, and which, as far as we are aware, have not been illustrated in any published drawings. The measurements for setting out the plan of the walls had to be made almost on the sly, as it may be said, owing to Turkish jealousy and suspicion of all sketchers, and great difficulties were encountered at first in regard to Saint Sophia and other mosques, but by perseverance and the assistance of some friendly officials these have been to a great extent surmounted, and Mr. Henderson has had advantages which English students of architecture in Constantinople have not hitherto enjoyed. We may observe that Mr. Henderson's examination of Saint Sophia has led him to reject the theory put forward in Messrs. Lethaby and Swainson's admirable book, that the dome may have been built without any centering, by laying the courses at a low angle instead of normal to the curve; he says the construction is really a ribbed one, and that he believes the ribs were built on centering and the filling done afterwards. It is to be hoped that the results of Mr. Henderson's assiduous labours will ultimately be given to the world in permanent form in a book, which would probably be a valuable one.

Revived Wood Engraving.

A SMALL group of artists are endeavouring to revive the practice of wood-engraving as a form of original artistic production, not merely a medium for the reproduction of other artists' work; and some seventy examples of their work are on view at the Dutch Gallery in Brook-street. That artists should take up again the actual process of cutting their own designs on the wood is an interesting incident in modern artistic life, and may have the effect of bringing wood-engraving again into favour after it has been so much injured and ousted by the various modern "process" methods of producing blocks for printing. But there is too much of an affectation of the manner of a past age in the works here exhibited. It is of course quite natural that when artists take up wood-cutting as a means of direct artistic expression they should be disposed to return to the old direct system of cutting away lights only and leaving masses of black, instead of defining the subject by thin lines left in relief after a laborious ploughing away the wood from between them; and the mere adoption of the older method may itself give an archaic look to the work. But Mr. T. S. Moore, in his fourteen engravings, is simply imitating the manner and effect of Blake, even to the incident of the rays of light emanating from behind a nearly black figure, which is seen in one of Blake's "Job" series. Mr. Ricketts, in "The Finding of Chloe," "Venus and Anchises," and others, reproduces the manner of the Poliphilo prints; and some others, such as "Venus and Diana," and "Eros and Anteros," are simply absurd pieces of mock-archaism. Little artistic good can come from this kind of work. Let the artists who are turning their hand to woodwork endeavour to express in it their own spontaneous feeling for effect and expression, in a modern manner, and not be content merely to assume the garb of a past period. There are some works here that are modern in feeling, but over the majority of them there is this assumed archaism; and it is a mistake.

Bute House Estate, Petersham.

WE read that the proposed laying-out of this estate (about twenty-one acres) for building purposes has been arrested by its purchase from Sir J. W. Ellis by a lady who resides in Petersham. Thus the foreground of the view from Richmond Hill will be preserved, as the lady, whose munificence we are pleased to record, intends only to rebuild the church, with a room for a parish institute, in memory of her father. The history of the estate may be briefly summed up thus: James Stuart, the second Earl of Bute (*obiit* 1732) married Anne, sister of the second and third Dukes of Argyll, sons of the first Duke by his marriage with Elizabeth, daughter of Sir Lionel Tollemache, owner of Ham House. John, the third Earl of Bute, the celebrated Minister, died in 1792, and was succeeded by his son, the Ranger of Richmond Park, advanced Marquis of Bute in 1796. The church, rebuilt in 1515, and much altered since, is a typical specimen, in red brick, of the "Georgian" style. It contains many monuments, one being to Vancouver, the voyager, who was buried there in 1798. There, too, lie the Misses Agnes and Mary Berry (1852), Walpole's correspondents, and Mortimer Collins. The village consists mainly of handsome old houses. Petersham Lodge was built, from a design by Lord Burlington, for the First Earl of Harrington, on the site of the house (burned down in 1720) erected by Lawrence, Earl of Rochester, Lord Treasurer, *temp.* James II. The manor, supposed to be the Patricesha of Domesday, belonged to Chertsey Abbey, until Abbot Thomas conveyed it to Henry V. It has, for a long while, been the property of the Tollemaches, Earls of Dysart.

Old Houses in Gray's Inn.

WE notice that the brickwork of some of the houses on the east side of each of the two squares is being cleaned, repaired, and repointed. In South-square, formerly Holborn-court, Nos. 2 and 3, have over their doorways "T. W. A., 1738"; over the doorways of Nos. 1 and 4 are "T. J. W., 1759," and "T. E. B., 1750," respectively; the doorways throughout the two squares are after one design. Gray's Inn-square was formerly divided by a middle row of chambers into Middle, afterwards Chapel-court, and Coney, or Conry-court; the greater part of Coney-court was consumed by fire in 1683-4, and rebuilt in three years afterwards. The middle row of chambers had been pulled down before Strype wrote his edition of Stow's Survey, published in 1720. "Cony Co." and "Holb. Co." are plotted in

J. Evans's map of London, to a scale of 8 in. to one mile, published on January 1, 1799, but we have the authority of Mr. Douthwaite, librarian to the Society of Gray's Inn, for saying that by an order of June 7, 1793, it was decreed that Coney and Chapel courts should be named "Gray's Inn-square." Field-court is so called from the adjacent Red Lion Fields, at one time the principal entrance to the Inn gardens was through Field-court by a gate, since removed, at the north end of Fulwood's-rents.

The Paris Exhibition.

THE Department of Public Instruction in France is spending something over half a million francs in connexion with the exhibition of 1900. The exhibits of this Department will include various laboratories of zoology and meteorology, as well as the results of the excavations in Persia and Chaldæa, and also a historical museum. The Department of Fine Arts will take a much more important part in the exhibition, and its expenditure will amount to 2,500,000 francs. This sum will be expended on architectural models, examples of decoration, stained windows, &c., as well as special exhibitions of the productions of the Sèvres manufactory of porcelain and the Gobelins manufactory of tapestries. The objects found in the ruins of Timgad, in Africa, will also occupy a special pavilion. The exhibitions of these and the other various Government Departments will altogether cause an expenditure of nine million francs.

Society of Painters in Water Colours.

THE present exhibition offers one point of special interest in the small loan collection of drawings by the late Mr. Boyce, who long before his death had ceased to exhibit, and whose works are therefore little known to the younger generation of visitors. The eleven drawings to be seen at the end of the room include some of his finest work, and illustrate the unusual combination which he showed of the most careful and finished treatment of buildings along with a peculiarly delicate rendering of sky and distance. "Where stood Bridewell Hospital" (211), "Old Tower, Venice" (215), and "Church and Ancient House at Ludlow" (218) are among the best, and should afford a lesson to some of the more modern painters of architecture who exhibit. In two cases St. Paul's (as usual) suffers severely at the hands of the artist; even Mr. Goodwin, in "A City Sunset" (43), contrives to distort the dome and spoil the outline of the towers, which besides are too far from the dome; and in Mr. S. J. Hodson's "St. Paul's from Fleet-street" one of the towers seems to have been unaccountably forgotten, and the lines of the dome are all out of perspective. In Mr. Goodwin's "Canterbury" (146), a charming little picture in the main, the celebrated tower, seen rising above the houses, is too thin in its proportions. "Christchurch" (170) by the same artist, a portion of the church seen by twilight and "lamp-lit from the inner," is a fine work, and "Thun" (128) shows delicate and careful treatment of the foreground architecture. His "Hastings" (148) is noteworthy for a most beautifully painted bit of sea. Among architectural subjects Mr. Rooke shows a powerful and highly finished drawing of "Nôtre Dame, Poitiers" (10), more of an architectural drawing in fact than a picture, but of first-rate quality as such. Among the landscapes there is perhaps no work of the highest order, but an unusually high general average, and it would be impossible to name all those which are worth looking at. There seems rather an increasing tendency towards broad effects and the study of colour rather than detail; Mr. Phillip's best work, for instance, "Mountain and Moor" (164) is a large sketch rather than a picture, but very powerful as such. We see the same tendency in Mr. Melville's "A Rosy City" (3) and in Miss Barton's "Bedtime" (11), landscape and cottages in evening light; and Mr. Eyre Walker is becoming less precise and more suggestive in his treatment of landscape, though his most sketchy work, "Stranded on an Essex Shore" (119), is a remarkable example of the poetry of desolation in landscape. This tendency to breadth of treatment is perhaps rather a wholesome contrast to the beautiful but rather artificial effects of such a painter as Mr. Tom Lloyd—perfect in their way, but looking like nature cooked, after a special recipe. Among the other landscapes that may be specially named are Mr. Herbert Marshall's "Rye" (28), Miss Butler's "The Light of the Lilies" (33), a very original little work; two or three drawings of Mr. Birket Foster which are exquisitely pretty cabinet art; the one work by Mrs. Allingham, "Old Farm, Pinner" (82), and Mr. Waterlow's "Evening in the Meadows" (301). Among figure subjects—never very numerous in this exhibition—Mr. Hughes exhibits three large red chalk studies, all good in their way (though the one entitled "Rosalind" is far indeed from realising Shakespeare's Rosalind), and a very pretty life size head, "A Study" (54); Mr. Clausen has a drawing of two ghosts threshing corn (24); Miss Phillott's head of "A Cottage Child" (7) is very pretty, and Mr. Marsh and Sir F. Powell each contribute an excellent study of a figure of everyday life; the former a picture of a lady reclined under sandbanks, reading, "By the Sea" (109), the latter a very carefully-studied figure of a "cheap tripper" kind of girl contemplating her own "Reflection" (126) in a still pool of sea-water. As to the figure subjects of Mr. Henshall and Mr. Glindoni, and the mild *diableries* of Mr. Brewtnall, the Society would be better without them. Mr. Bulleid's quasi-antique figures continue to be pretty, but they do not get beyond that.

Minor Exhibitions in London.

AT the Goupil Gallery there is a double exhibition of Japanese prints and Rookwood pottery. As to the prints, they are a valuable collection to those who wish to study various methods and dates in this class of Japanese work; to regard them as of artistic value in a serious sense is only a pose of the present day, as Dutch tulips were in the last century. The Rookwood pottery is stated to have been the first indigenous art product of the United States; the manufactory has now been in work for nearly a quarter of a century, and the articles on view at the Gallery show its present level of achievement, and are of the greatest merit both in regard to form, colour, and delicacy and piquancy of decoration; vigour and force of effect there is not, but in every other quality the work is beautiful. Messrs. Tooth & Sons have added o their winter exhibition a small collection of water-colours by Mr. Birket Foster, illustrating "places of interest in Scotland"; some of these, such as "Hawthornden" and "Roslin Castle," are the perfection of pretty delicate landscape of the vignette type; others are very weak—see "Tantallon," for instance, with the conventionally touched-up rocks in the foreground; and none convey anything of the real feeling of Scottish scenery. At Messrs. Dowdeswell's Mr. Hyde's black and white sketches, made as illustrations to Mr. Geo. Meredith's poems, are very fine and bold, and include some very powerful landscape effects; we may compliment him on showing us for once an artist's sketch of St. Paul's (No. 59) which is carefully studied and accurate in proportion and drawing.

Views in Morocco.

AT the Society of Fine Arts Gallery there is a collection of paintings of Southern Morocco and the Atlas Mountains, by Mr. Tom Robertson, which takes us into a rather new region of landscape-painting, where the principal constituents of the scenery are apparently sand and blue water, with only the distinction between sand in flat expanses and sand in mounds or hills; at least that is the impression produced by the paintings, which are very slight in handling, and hardly convince us that they form an adequate representation of the reality. Two or three of the views include curious relics of architecture, "saint-houses" or tombs, which are of some interest.

Minor Exhibitions in Paris.

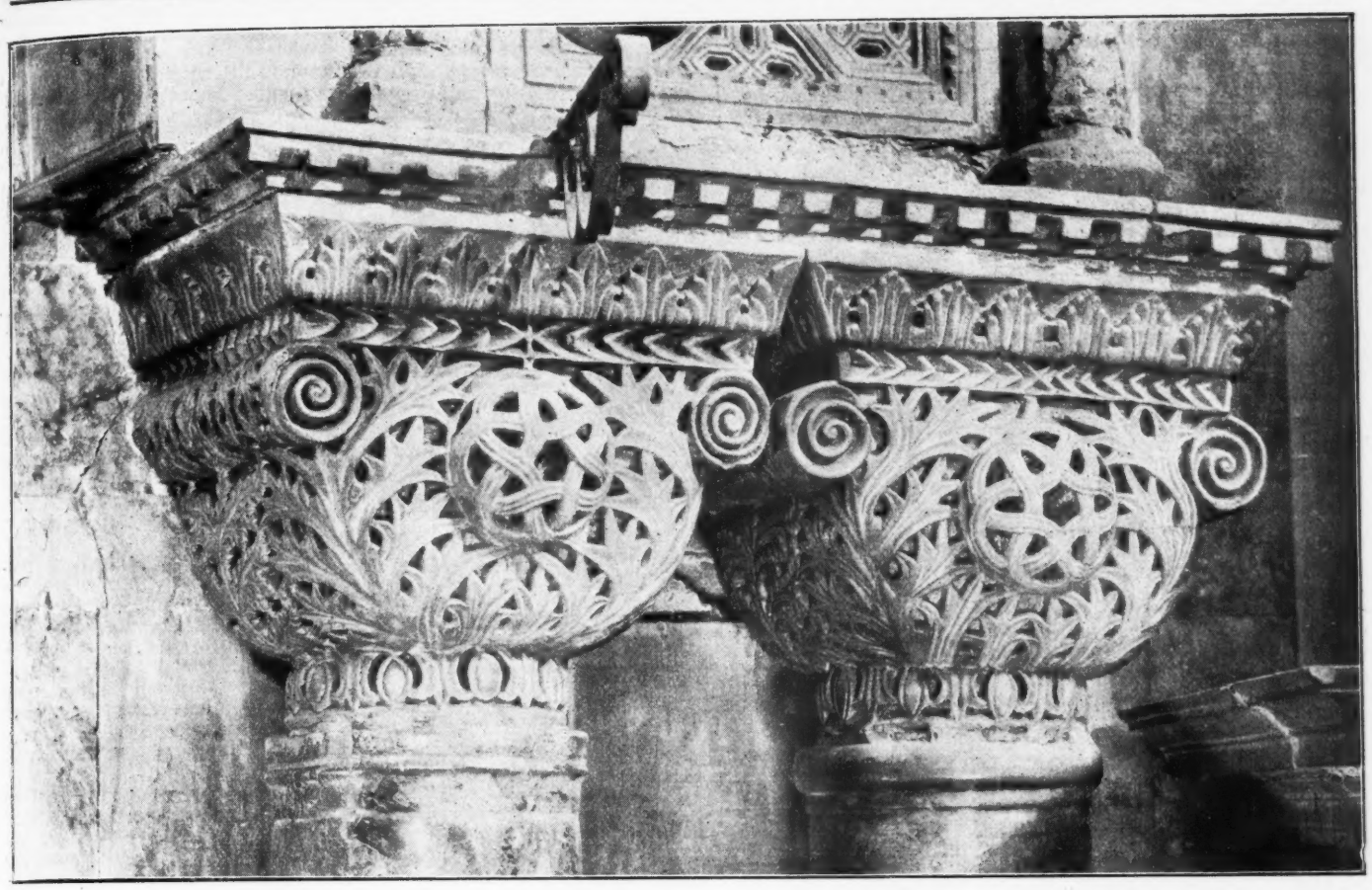
Two interesting exhibitions are open in Paris. One, at the establishment of M. Hesselle, 13, Rue Laffite, consists of drawings, pastels, and etchings by M. Georges Jeanniot, the painter of military subjects. This will remain open till December 15. At the Gallery of M. Bing, Rue Provence, another painter, M. Raffaelli, who excels in the pourtrayal of types of the French middle classes, has collected a number of etchings and dry-points of studies which show great originality and perception of character, as well as a very free broad style in etching.

VENICE.*

CENTURIES ago, when the Christian era had but lately dawned on the darkness of Paganism, there lay on the eastern seaboard of the plains of Lombardy a desolate tract, half land, half sea, where the waters of the Piave, the Adige, the Padus, and many other rivers emptied themselves into the Adriatic—a long, marshy waste, averaging from three to five miles in width, with sand banks against the sea, and divided by it into long, narrow islets and with a deposit of mud between, cut into numerous channels by the deltas of the streams, and from which the sea never went back—a region which invited none, but where the refugee might make his home and welcome, safe and free from the bands of conquering tribes.

Such was the desolate coast line north of the Padus in the fifth century, when the Goths under Alaric and the Huns under Attila came down upon the cities and gardens of Lombardy and looted, and burned, and spoiled. They reached Padua, but the inhabitants who could escape fled away towards the sea, and took shelter on the wild lagunes, as they were called. An island where the channels were deep enough to admit of Greek and Roman vessels of considerable burden was chosen as a centre and called the Isola del Rialto, or the "Island of the Deep Stream." This became the port of Padua, and on it a few rude buildings were erected, and in 421 a church on the traditional site of St. Mark's — probably a humble building in the Late Roman or Basilican style.

* A Paper read before the Bristol Society of Architects, November 14, by Mr. Mowbray A. Green, A.R.I.B.A. A number of illustrations of Venice, selected to accompany this paper, will be found among our lithograph plates of this issue.



Two Capitals, St. Mark's, Venice.

In 593 the Lombards took Padua, and the inhabitants, fleeing again, joined their ancestors in the lagunes, chose Torcello as their home, and called it the "Port of the Deserted City." Hither, too, at a later period came refugees from Altino and Aquileia and in the seventh century the see of Altino was transferred to Torcello. From now to the eleventh century Torcello was in its zenith with nobility, senate, and a distinct government, and in a field stands the stone chair on which the podesta or chief ruler probably used to be enthroned, but which tradition, with a touch of irony, has called the throne of Attila.

Its famed cathedral, of great simplicity, was built in the eleventh century by the Bishop Orso Orseolo, son of the Doge. The windows of it, closed with stone shutters (but now also glazed), a low screen enclosure of marble raised a little above the nave for the singers, and the pulpit with its severe sculpture, all yet remain, but the greatest interest attaches to the apse with its marble seat for the clergy and the throne for the episcopos, carried round the apse except where the flight of steps to the throne breaks the continuity of the curve; probably the most complete as also the most ancient in existence. But Torcello went to decay in that same century and, although from the summit of the rudely-built brick campanile the eye rests upon the same far off scene of natural splendour as when the struggling people were rising to prosperity, yet at one's feet there lies the deserted quay, the grass grown piazza, the desolation of a dead city.

Before returning to the Isola del Rialto we must give our attention for a moment to another important island which lay about a mile to the north of and was larger than the Rialto, indeed the largest in the lagunes. Murano, founded early, at first independent of, but afterwards a dependency of, Venice, became so important that it was raised to a separate municipality and had its own Podesta.

The cathedral of St. Donato, Murano (see lithograph), basilican in plan, was founded in the ninth century, but rebuilt in 1111. The walls are chiefly of a dark yellow, and the decorative part of a deep red brick. Internally it is very beautiful. Stalls run round the apse, and the mosaics, pavements, and columns of Greek marble are not unworthy to be compared with those of St. Mark's, with which church, together with Torcello and some of the Palaces, it forms a group of some of the most notable Byzantine work in and around Venice.

To return to the Rialto, which now began to form the nucleus of a town, and where houses and bridges were fast rising from the lagune. Before the final fall of Padua the emigrants to the Rialto had at first received their rule from the Mother City, but when she fell and the refugees, as we have seen, joined those who had fled before, each of the twenty-four principal islands elected a tribune, and these met on certain days for consultation, and held a *concio* or general assembly of the people on important occasions. But 200 or 300 years sufficed to occasion differences among the tribunes and strife among the people, all threatening civil war, whilst foreign enemies, drawn by the increase of the colony, strove to attack the island city. A strong government was needed, and at a concio held in 697 Paul Luke Anafesto was chosen the first governor, under the title of Doge, or Duke. He was to appoint the tribunes and judges, administer justice to clergy and people, and was himself to be the highest tribunal of appeal. He was chosen for life, with power over the revenue and to convoke the general assemblies. His administration was powerful and good, and he added to the territory of the islands a strip of the mainland. His proud successor was put to death by the people, and the assembly, dissatisfied with the Doge's rule for life, resolved in 737 to elect a magistrate for five years, who should be called Maestro della Milizia or Master of the Militia, and the seat of government was removed from the island of Heraclea to Malamocco. But the new Government was not favoured by the people, and after the reign of the fifth master the office of Doge was restored, only to exhibit afresh the hard mastery of the Doge on the one hand, and the rebellion of the people on the other, ending by the deposition of the Doge, who was often punished with the loss of his sight. Thus passed nine rulers, until in 809 the Doge Angelo Participazio became the real father of the State and founder of the metropolis; he restored peace, made the Rialto the seat of government, founded the Ducal Palace, and connected the groups of islets by numerous bridges. The people had been the Veneti; henceforth Venice should be its name.

About the year 828, so the story goes, it happened that some ships from Venice were trading at Alexandria, and the captains hearing that the church containing the body of the Evangelist Mark was about to be destroyed, and remembering the tradition that when alive he had visited Aquileia and other Venetian isles, obtained leave to become possessors of the body, a difficult enough task as the relic was highly prized, so they were compelled to carry it off to the ship in a large basket covered with herbs and with joints of pork, hateful to every Mussulman. Landed safely at Venice there was great rejoicing, the evangelist became the patron saint, and the winged lion was stamped on their coins and painted on their banners. Having traced the origin and foundation of Venice thus far let us now see the progress of their early buildings.

The basilica which is said to have received the body of the evangelist had been built scarcely 150 years before it was destroyed by fire, and in 977 a new building was begun, it is supposed, by Byzantine workmen. Nearly a hundred years later it is said that the outer shell only was finished, and it was not till the beginning of the thirteenth century that even the Byzantine parts were completed, and the Gothic a century later.

When we emerge upon the upper end of the wide, open Piazza, glowing with sunshine, but with deep recesses on either side, the Procuratie Vecchie on the north and the Procuratie Nuove on the south, the great tower of the Campanile in the distance, and beyond, the brilliant façade of St. Mark's, it is indeed a striking scene.

Before the Duomo rise the three red flagstaffs of cedar, set in magnificent pedestals of bronze, wrought by Leopardo in 1505, and from whence floated the gold and silk banners of the three possessions of the republic, Candia, Cyprus, and the Morea. Two of the large entrance-doors are of the ninth, two of the thirteenth, and one of the beginning of the fourteenth century. The bronze horses are supposed to be of Roman workmanship of the first century. Constantine took them to Constantinople, and thence the Doge Dandolo conveyed them to Venice in 1204. In 1707 Napoleon I. carried them to Paris, but in 1815 they were brought back to their old place. We may specially notice also the northern door of the west façade, with a mosaic of the exterior of the church, executed about the twelfth century, a bronze door of 1300, the Arabian door on the north side, with its rich archivolt, and the view of the south-west angle of the basilica from the Piazzetta.

To pass to the interior. Along the whole front of the church there runs the atrium or narthex for the catechumens or new converts, who as such, were not permitted at once to enter

the church. The vaulting is entirely covered with mosaics, some of the twelfth century, and shows subjects from the Old Testament. At the south end we enter the baptistery, vaulted with cupolas; near the window is the tomb of the Doge Andria Dandolo, who died in 1354, the writer of the Venetian annals, and the last doge to be buried in the church. The figure on the bronze font is that of John the Baptist, and the font itself has fine bas-reliefs. From here we pass into the church, which seems at first to be filled with gloom. It is a Greek cross, with a central dome and four smaller ones round it, and a great apse at the east end, with a smaller one on either side. There are massive piers and columns and deep recesses, but the light comes so feebly through the windows that the forms are at first not visible. It is a mighty building, 86 yds. long and 70 yds. wide, filled with marbles and mosaics—mosaics from arch to arch and dome to dome, marbles from column to column and pier to pier, the walls incased with it, the floor covered with it. Venice had, indeed, laid under tribute the richest of treasures for her church, a church which was not, after all, the Duomo, but the chapel of the Ducal Palace. Two ambones of coloured marble stand on either side of the screen, intended for the reading of the gospel and epistle; then there is the pala d'Oro or altarpiece of enamelled work, with jewels wrought on plates of gold and silver, executed in 1105, and originally intended for the front of the altar; the great rose window of the south transept; the treasury, the crypt, the details of the mosaic, executed chiefly in the twelfth and sixteenth century, the pavement, and much more there is to see. But we must hasten on.

Turning out of the Piazza and towards the sea we walk through the Piazzetta, on the left side of which is the Ducal Palace, on the right St. Marks' Library, and at the end the two granite columns from Constantinople crowned by the statue of St. Theodore and the emblem of St. Mark—the winged lion; between these columns was the place of execution. We are now in the Riva dei Schiavoni, paved with slabs of unpolished marble, and at the south side of the Ducal Palace looking toward the island o St. George. From the sea called the Basin o St. Mark the group of buildings are seen best, the Prigioni (or prisons) on the right, the Bridge of Straw, the Ducal Palace, the columns, the Library of St. Mark, and the Zecca or mint. The prisons were built in 1589 to replace the unhealthy cells of the Ducal Palace. The Library of St. Mark was built by Sansovino in 1536 to contain the bequest of Petrarch, and the Zecca was built by the same architect at the same time.

Landing again near the prisons and passing over the Ponte della Paglia or Bridge of Straw, we are at the oldest portion of the palace, here connected with the prisons by the Bridge of Sighs. Before examining the Palace further, let us for a little look at the history of the life of the city so closely connected with this building and here I must ask your indulgence lest I seem to be tedious. In the eleventh century, the State, acquiring great privileges, entered into friendship with the Greeks and was associated with them in the Crusades. In 1098 their first fleet, headed by the Doge Vitali Michieli, numbered over 200 ships, and four years later Ordelafo Faliero obtained from Baldwin the grant of a fourth part of the city of Acre and free commerce throughout his kingdom of Jerusalem. Ths next doge but one acquired further dominions in Palestine and striking privileges were granted to residents from Venice. In 1125 he returned home with honours, bringing with him the two columns which we have seen and a third lost in landing. But Constantinople became jealous of Venice and displeased at her assistance given to the Latins. War ensued, Venice being worsted, but in 1203 the fourth Crusade assembled at Venice, and led by the old blind Doge Dandolo, who had persuaded them to let him take the head, landed at Constantinople and commenced a successful attack, but it was not till the second expedition of 1205 that Venice triumphed fully, and the Byzantium Empire fell. Much spoil was brought back, and the four gilt-bronze horses. Venice had secured the Pelaponnese; Eubœa, Andros, Ægina, Salamis, and other Islands of the Ægean; Sestos and Abydos on the Dardanelles; some towns in Thrace; the Ionian Isles; the coasts of Epirus and Acarnania, the province of Durrazo, and Crete. On his return Dandolo was allowed, amongst other honours, to take the title of Despot of Romania and Lord of al quarter of one-eighth of the Roman Empire.

Thus the Crusades gave an impetus to Venice, and also the power to acquire treasure from foreign lands, and not only so, for the minds of the people became filled with a taste for Eastern art, while their merchants were continually bringing home rich marbles and precious things, and so little thought did they come to have for anything but the acquirement of treasure that it has been said of them that they were reduced to purchase the luxuries of Asia by supplying the slave market of the Saracens. Meanwhile, there had been certain changes in the government, for two assessors had been appointed to the doge, and in 1094 a supreme court of three, "Judges of the Palace" as they were called, took the power of final appeal out of his hands. Still further, in 1172, there was practically a revolution of the government, for the power of choosing the doge was given into the hands of eleven men chosen from a great council of 470 or 480 persons. A Senate also was chosen from the Grand Council, and four assessors added to the two spoken of above; these afterwards became "La Signoria," and from these proceeded the legislature. The ruling power was fast becoming an aristocracy.

It was during the reign of the Doge Ziani that the Emperor of Germany, Barbarossa, after persecuting the Pope Alexander III., was at length compelled to ask for peace in the city where the Pope had before taken refuge and humiliated himself before the Doge at the portico of St. Mark's. In return for the protection given him during his exile, the State was allowed by Rome to attach a seal of lead instead of wax to all State documents, in the same way that Rome did. Under the second Ziani, Venice was at war with Genoa, and the ten years' naval war ensued, in which Venice, with her fleet broken, was compelled to make peace with Palæologus of Constantinople. It was this Ziani that repaired and enlarged the Byzantine Ducal Palace, which was afterwards merged into the Gothic, and who laid out the Piazza of St. Mark. The elective power of the people and the ruling power of the doge were now fast slipping away, and when the people tried to elect the doge, the Grand Council compelled him of their choice to leave Venice and put Pietro Gradenigo in his place, a man chief of the aristocratic party, who, on February 28, 1297, brought up the famous decree called Serrata del Maggior Consiglio, or Shutting of the Grand Council, and founded the hereditary aristocracy, an immovable, terrible, revengeful, indulgent tribunal, which yet was impartial in justice and beloved by the people, but dreaded by the nobles. This event is most important as drawing the line between the first 900 years of the existence of Venice, when doge and people had a share in and influence upon the government, and the next 500 years, when the nobles took the reins of government absolutely into their own hands with the doge as but a figurehead. Conspiracies, however, followed, notably that of Tiepolo, which led to direct reforms. The well-known Council of Ten was formed, appointed first for a few days, but eventually in 1335 declared to be permanent with many additional powers. They had absolute control over every man in the State, and were held free from all responsibility. They wore black robes of office and were called *I Neri*, "the Black," and to them were afterwards added the Seignory, as assessors, called, for a similar reason, *I Rossi*, "the Red." About this time the city received great adornment from its commercial prosperity, but the fourteenth century is chiefly memorable for the notorious plot of Marino Faliero, who, tired of wearing the ducal cap without the ducal power, determined to boldly overthrow the Government and massacre the nobility of which he was himself the nominal head. But the conspiracy was discovered on the day before that on which it should have been carried out, the conspirators were put to death, and Marino Faliero was beheaded at the top of the staircase—where he had been crowned. Among the ducal portraits in the Sala del' Maggior Consiglio there is an empty frame and this inscription, "Hic est locus Marini Falieri decapitati pro criminibus."

The end of the fourteenth and the beginning of the fifteenth centuries are marked by the Genoese war, the loss of Chioggia, and its recovery by the brave Admirals Vittor Pisani and Carlo Zeno, and the wisdom of the Doge Tomaso Mocenigo, who only reigned a few years. The reign of his successor, Francesco Foscari, was sadly ended by his deposition by the Council of Ten, and he died a few days afterwards.

Venice was now the possessor of all the coast from the estuary of the Po to the island of Corfu, and her revenues were enormous. Palaces were built, treasure was amassed, the arts were flourishing. The art of glass making and glass engraving in Murano was revived and brought to great perfection, and a little later printing flourished, especially under the skill of Aldus Manutius, who invented the italic type. The chief painters of the period were Giovanni, Antonio and Bartolommeo Vivarini (known as the Muranese), Antonello da Messina (a stranger who introduced painting in oils), Jacopo Bellini and his sons John and Gentile, and Vittore Carpaccio. It was the zenith of her power; but her decline was at hand. Constantinople was captured by the Turks in the middle of the fifteenth century, and her Eastern power was enfeebled, but the discovery of America and the new sea route to India, thereby diverting her commerce to the Portuguese, was the blow that made itself most powerfully felt.

In 1454 the Inquisition of State was introduced. There were three members of the Council of Ten and one of the Council of the Doge. The authority of the Ten was transferred to them and the State was put under the ban of an awful, invisible, irresponsible system of espionage. The lion's mouth in the Ducal Palace was open to receive accusations, true and false, and men dared not to speak a word against their government under pain of almost instant death. In 1508 the league of Cambray, formed by the Pope, the Emperor, and the kings of France and Arragon against Venice, began to press heavily upon her, but she partially recovered. Gradually, however, her decline came on, until in 1797 Napoleon took the city, and thus fell one of the proudest, most ambitious, wealthy, and licentious cities in the world. It should be here noted that Ruskin dates the commencement of her fall not from the middle of the fifteenth century, but from the death of the Doge Tomaso Mocenigo in 1423.

To return to the Ducal Palace. We are now at the south-east angle on the Riva degli Schiavoni, and from here to the seventh main arch inclusive, on the Piazzetta side, is the work of the early part of the fourteenth century, begun in 1301 under the Doge Gradenigo; thus, be it noted, the Gothic Palace commences with the rise of the aristocracy to power. This part is said to have been built by Bartolommeo and Pantaleone Buon. From the seventh arch to the Porta della Carta is of the fifteenth century, built at the instance of the Doge Mocenigo and in the reign of his successor, Foscari; most of the capitals are copied from the earlier work. There are thirty-six columns below, seventy-one above. The sculpture above the capital at the angle of the Piazzetta and the Riva represents the Fall of Man, and that by the Porta della Carta, the Judgment of Solomon; the latter is under Renaissance influence and is of inferior workmanship.

We have seen that the Byzantine Palace of Ziani had been merged in the Gothic, but the Renaissance one was only grafted on to the Gothic, so that at this day the two latter remain as one palace, the character gradually changing from the seventh arch to the Renaissance Cortile, this change being seen more in the details than in the main design.

Passing through the Porta della Carta, so-called because the decrees of the State were posted there, and in which we see a strong Renaissance tendency, we come to the Cortile begun at the end of the fifteenth century by Bregno and Scarpagnino. The east façade is entirely finished. Notice the well top of bronze, of which there are two in the Court, and the Giant's Staircase leading to the interior of the palace, with the colossal figures of Mars and Neptune executed by Sansovino in 1554. The old staircase on which the doges used to be crowned, and where Marino Faliero met his death, was at the southern end of the same façade. The detail is that of one of the windows on the second floor. Inside, on the first floor, is the Sala del' Maggior Consiglio, or hall of the Grand Council, where the Nobili, whose names were written in the "Golden Book," sat; the portraits of seventy-six doges, beginning in 810, are painted on the frieze. Tintoretto's "Paradise" is on the east wall, and there are many historical pictures round the room. The Sala del Scrutinio, or voting hall is on this floor also, and here the portraits

of the doges down to Ludovico Manin (1797) are continued. The Library of St. Mark is in this part of the building. Above are many halls, notably the Sala della Bussola, once the ante-chamber of the three inquisitors, and by the entrance to which was the lion's mouth ; the Sala del Senato, where sat the Council of Ten, the inquisitors, the procurators of St. Mark and others, all presided over by the doge ; and the Sala del Collegio, where ambassadors were received.

From the Hall of the Council of Ten is a staircase winding up to the roof, where were the piombi, or leads, and where prisoners were confined. Under the palace are the pozzi, or dungeons, fearful places of coufinement. On the east side is the passage leading to the Bridge of Sighs, on the farther side of which are the prisons which have replaced the old pozzi, where prisoners are no longer confined.

Much of the splendour of the ancient palace still remains.

Turning into the Piazza again, we may just notice the Campanile of St. Mark's, begun in 902, and completed by the belfry in 1510. It is 323 ft. high, and a magnificent view of the city is seen from it. At the north-west angle of St. Mark's is the Clock Tower built by Lombardo in 1496, and on the north wall of the church are many marble Byzantine reliefs. The Procuratie Vecchie were built in 1517 to accommodate the procurators of St. Mark's, the highest officials next to the doge. The Procuratie Nuove are of the latter part of the same century.

The principal church of Venice next to St. Mark's is the Frari (see lithograph), a Gothic building under Italian influence, such, for example, as is seen in the twelve circular buttresses. It was begun before the middle of the thirteenth century, and completed before 1338, by Niccolò Pisano. It contains the tombs of many eminent citizens. The pillars of the nave are circular and massive, with pointed arches over. In the choir on the right is the tomb of the Doge Foscari, 1457, a mingling of Gothic and Renaissance, not good, and on the left that of the Doge Niccolò Tron. Titian and Canova are buried here. The choir stalls are by Marco da Vicenza, 1468. The monastery adjoining this church contains the finest collection of archives in the world. They number about fourteen million documents, dating from 883.

The church of S. Stefano is of the fourteenth century, with a brick façade and terra cotta window mouldings.

The church of SS. Giovanni e Paolo (see lithograph) was begun before the church of the Frari, and under the influence of Pisano, but not finished till 1430. It has an unfaced brick façade, Gothic in style ; it has in the interior ten circular columns and a dome. The doges are mostly buried here, and in the choir is the tomb of the Doge Mocenigo, by a Florentine, sculptued in 1424 ; one of the last good pieces of Gothic work, with very slight Renaissance influence. In the south transept is a fifteenth century window, a somewhat rare thing in Venice. The east end is apsidal. This church contained the great work of Titian, the "Death of Peter Martyr," unhappily destroyed by fire in 1867. Near here is the school of St. Mark, with a fine façade built by the Lombardi in 1485. Upon it are sculpured reliefs in perspective, two lions, and the achievements of St. Mark. These schools, in Venice, were composed principally of laymen under the control of the church, and were founded for benevolent purposes, being voluntarily supported.

In the square is the bronze figure, on horseback, of Bart. Colleoni, General of the State, who died in 1475, and is buried at Bergamo. The statue was modelled by the Florentine sculptor, Verrochio, and cast by Leopardo, the Venetian, about twenty years after the General's death.

The façade of the church of S. Maria del' Orto illustrates the transition from the late Gothic to the style of the Lombardi. It was built by Pietro Lombardo soon after 1481, and has a flat wooden ceiling inside, supported by columns. Tintoretto is buried here. About this time was begun the church of the Miracoli, finished seven years later, an early Renaissance building also under the influence of Lombardo. It is incrusted with marble on two of its façades and internally throughout. The choir is quadrangular with a dome, and there are ambones right and left for the reading of the epistle and gospel as in the old Christian churches. As it has coffered-barrel vaulting we may take it that the doubtful artistic taste of a great circular pediment is, at least, honest. The church of S. Zaccario, of ancient origin, but rebuilt by Martino Lombardo in 1457, has somewhat of a Gothic feeling in the choir. The nave has round arches on Corinthian columns. The façade partakes of the Lombardi type, and in general effect is good. The church of S. Sebastiano contains the tomb of Paul Veronese. The church of St. George of the Greeks has a good Renaissance campanile of the middle of the sixteenth century. Following on these in order of date are some of the churches built by Palladio. The chief is that of S. Giorgio Maggiore on an island opposite the Piazzetta. It was begun by Palladio in 1560, and finished by Scamozzi in 1575. It is cruciform with a dome and apsidal ends to the transepts. Il Redentore (the Church of the Redeemer) was built by Palladio on the island of Guidecca, after the cessation of the plague in 1576. A successor of Palladio, Longhena, built the church of S. Maria della Salute, where the eastern end of the Grand Canal opens into the wide waters of the lagune. It is erected on piles, and was built in 1631-82 in memory of the ceasing of the plague of 1630. The Church of S. Pietro di Castelli was in the seventeenth and eighteenth centuries the cathedral church, but in 1807 St. Mark's took its place.

The Grand Canal, the great waterway of Venice, has its banks, as no doubt you know, adorned with many palaces and houses. It is nearly two miles long, and averages 33 yds. to 66 yds. in width. The pali or posts in front of the palaces were formerly the distinguishing marks of the dwellings of the nobles, and still remain so to a certain extent. Upon them are painted the heraldic colours of the owners. Philip Comines, an ambassador of Charles VIII. of France, who was honourably entertained on his entrance into the city, thus describes it as he saw it in the fifteenth century : "Sure, in my opinion," he says, "it is the goodliest street in the world, and the best built, and reacheth in length from one end of the town to the other. Their buildings are high and stately, and all in fine stone. The ancient houses be all painted, but the rest, that have been built within these hundred years, have their fronts all of white marble, brought hither out of Istria, a hundred miles thence, and are beautified with many great pieces of porphyry and serpentine. In the most part of them are at the least two chambers, the ceiling whereof is gilded, the mantle trees of the chimneys very rich—to wit, of graven marble, the bedsteads gilded, the presses painted and vermieled with gold, and marvellously well furnished with stuff. To be short, it is the most triumphant city that ever I saw, and where ambassadors and strangers are most honourably entertained." One of the oldest buildings on the canal is the Fondaco de'Turchi (see lithograph), Romanesque of the tenth century, afterwards (in the seventeenth century) used as a depôt for Turkish merchandise. It is now the Museo Civico. The palace of the Contarini-Fasan, opposite della Salute, is in the pointed Gothic of the fourteenth century. Though a very small house, the work is beautiful, and it is one of the chief ornaments of the best part of the canal. The traceried balcony is, perhaps, the only one of its kind in Venice. The Frascada Palace belongs to the end of the same century, and is in the same style as before. In the background is a part of the school of St. Rocco, of the early Renaissance, where is Tintoretto's masterpiece of the "Crucifixion," painted in 1565. The Ariani Palace, somewhat of the Ca d'Oro type, once belonged to a patrician family who were excluded from the Grand Council towards the end of the century. The Ca d'Oro (rather Doro) belongs to a distinct class of palace, characteristic of the doges, and possessing a large entrance colonnade, a loggia on the upper floor with a number of windows placed close together in the middle, and an abundant use of decoration and colour. Notice the almost universal use of square balconies in Venice, often filled in, not with balusters as generally used, but with little plain columns of a Romanesque type ; the Venetian baluster proper we shall see later on. The date of the Ca d'Oro is 1424-30, and it belonged to the Contarini family, who intrusted the building of it to John and Bart. Buon. A year afterwards the marble was painted and gilded by a Frenchman, whence its name, House of Gold. A little later, and of the same type, is the Foscari Palace, where lived and died the Doge Jacapo Foscari, after a reign of trouble, ending in his deposition. The top story was added by him. The Palazzo Cavalli, a good building, founded on the Ducal Palace, dates from about 1380. There are fine crests, heads of sea-horses, inserted on either side of the entrance door. The Contarini degli Scrigni is of the fifteenth century, on the Trovaso Canal, turning out of the Grand Canal. Notice the Venetian chimneys. The Dario Palace is in the style of the Lombardi, and was built at the close of the fifteenth century by one Giovanni Dario, a Venetian, as would appear from the inscription, "Genio Urbis Ioannes Darius." It is greatly adorned with coloured marbles.

We now pass to the Renaissance palaces proper. Of these the Vendramin, in the early style, is a good piece of work by Pietro Lombardo, dating from 1481. The motto on the exterior is "Non Nobis." The interior is magnificently adorned. Mr. Ruskin speaks of the Renaissance in Venice as based in order of merit (1) on Byzantine work, (2) upon Gothic, (3) upon itself. This palace would seemed to have had its *motif* from the Gothic. The Palazzo Contarini della Figure, 1504-64, belongs to the early school of Renaissance, and derives its name from shields and trophies hung on the wall. Very similar to this is the Capello Palace, built by the patricians of that name. Its façade was originally adorned with frescoes by Paul Veronese. These two last palaces show an influence from the school of the Lombardi. The Camerlenghi Palace, situated near the Ponte Rialto, is of the Early Renaissance style, and is attributed to William Bergamasco, 1525. It was once the residence of the three State officers who administrated the public expenses. In the distance on the left are the Fabriche Vecchie or the Old Buildings, used as public offices, and built by Scarpagnino, 1520-22. The Zen Palace is from designs by Sebastiano Serlio, 1531.

The Grimani (see lithograph) is the masterpiece of San Micheli, 1595. The Doge Grimani lived here, and here the Dogeressa Morosini was crowned in 1597. It is now the court of appeal. Ruskin considers it the best piece of Middle Renaissance in Venice. The orders are all Corinthian, but the lowest one has pilasters instead of columns. Notice that the balcony and cornices run unbroken through the building. The Palazzo Corner-Spinelli, of the sixteenth century, is attributed to Pietro Lombardo and Guglielmo Bergamasco. It is a well-proportioned building, in parts not unlike the Vendramin Palace, but with sterner and more Gothic feeling. Notice the circular balconies and the landing stair, also the delicate contour of the symmetrical baluster, a form very generally used throughout the Renaissance buildings of Venice, with a central necking and a gentle swelling above and below. It is usually widely spaced, and it is remarkable that, so set, the baluster is in no way impoverished, but rather has more dignity. The Papadopili, or Coccina Palace, is said by some to be by Palladio, but more probably by a pupil of Sansovino, and would date from about the end of the sixteenth century. Pediment heads to the windows are more freely used here. The Pesaro Palace was built by Longhena in the seventeenth century Its interior is sumptuously adorned. The balcony on the left, but presumably not part of the palace, gives a good instance of the severe treatment of these projections in Venice, and the beautiful line of the corbel stones. The Labia Palace is of the seventeenth century, and belongs to a rather late school, though it will be noticed that this and other buildings in Venice, though even of a later date, do not show such an advanced Rococco feeling as is sometimes seen in other cities. This seems to be mainly due to the keeping of the long unbroken horizontal lines on the façade of the building. Possibly also the fact that many of these buildings have one façade only, and have other buildings closely contiguous to them and in the same straight line, may have kept in check the exuberant spirit of their builders. Again as we cannot but have seen in the Gothic work, in a climate where the sun shines so brightly and casts such depths of shadow from the simple moulding—perhaps even a square one—there would not be the suggestion that new effects might be gained by breaking up the façade into so many portions, and thereby sacrificing breadth of effect to variety of light and shade. There still exist in the interior fine frescoes by Tiepolo, a decorative painter, who died in 1770. The Rezzonico, now the

Browning, Palace (see lithograph), was designed in 1752 by Giorgio Massari, a good architect in his day. It was purchased by the poet Browning, who died there in 1889. The baluster as used throughout the later Renaissance buildings is here well seen. It is somewhat similar to that of the Corner-Spinelli, but stouter, and of less delicate outline. The mouldings of the balconies are kept as square as possible.

There are many picturesque bridges in Venice, one of the finest, next to the Rialto, being the Bridge of St. Job, crossing the Canareggio Canal. It was built by Tirali in 1688, and very largely restored in 1794. It will have been noticed that nearly all the bridges in Venice are built on a definite design. The arch is segmental, and the line of parapet, instead of following it, is flattened at the top, and thence the sides slope down in a straight line to the point of approach. Thus, seen at the side, it has the appearance of a portion of a circle inscribed within an octagon.

The finest bridge is, of course, the Rialto, situated about midway in the Grand Canal. It was the work of Antonio da Ponte in 1588-91. It joins the two sestieri of St. Mark and the Rialto, a sestiere being one of the administrative districts into which Venice is divided. The marble arch is of 74 ft. span, and is 46 ft. wide, and the abutments are built on 12,000 piles. From the twelfth to the sixteenth centuries the bridge was of wood, and down to 1854 was the only connexion between the east and west quarters of Venice.

The regatta or boat race was famous in Venice once. Some derive the word from "remigata," or stroke of the oars, and some from "riga," a straight line. Records of the races date from the fourteenth century, and royal pageants were witnessed in the fifteenth, sixteenth, and eighteenth centuries. The races are now rowed in gondolini, or small boats shaped like a gondola.

The parts of Venice that lie behind the Grand Canal on either side may be seen on foot as well as in a gondola; and in them and the squares may be found many interesting views and scenes.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS:

FIREPROOF CONSTRUCTION OF BUILDINGS IN THE UNITED STATES.

THE third General Meeting (Business and Ordinary) of this Institute for the present Session was held on Monday at No. 9, Conduit-street, Regent-street, the President, Professor Aitchison, R.A., occupying the chair.

The minutes of the previous meeting having been taken as read, the following candidates for membership were elected:—As *Fellows:* R. Lockhart McCowat, Johannesburg; W. W. Cooper, M.A.Cantab., Diocesan Architect to the Diocese of Grahamstown, Cape Colony; H. T. Hare, London; W. H. Duffield, London. As *Associates:* J. C. Baines, London; C. W. Surrey, London; A. Herbert, Leicester; L. Moore, Woolston, Southampton; P. C. Blow, St. Albans; J. S. Harrison, Leicester; Ethel Mary Charles, London; A. R. Gough, Redland, Bristol; C. Riddey, Wellingborough; V. E. Bösher, St. Leonard's-on-Sea; R. W. Carden, London; A. W. Vercoe, Lee, S.E.; A. Cowie, London; G. McMichael, Birmingham. As *Hon. Associate:* Sir Alexander Binnie.

The following results of the November Examinations were then announced:—

The Preliminary.

E. A. Agutter, London; J. M. Alexander, Ashton, Gourock, Scotland; H. W. Amies, London; D. Anderson, Coventry; H. C. Anderson, Leeds; J. L. Armour, Gateshead-upon-Tyne; J. M. Arthur, Airdrie; J. H. Balderstone, Padiham, Lancs.; W. C. Barker, Hebden Bridge, Yorks.; C. Batley, Ipswich; R. Bennett, Buxton; Fort Vincent Blacka, Todmorden; L. M. W. Bladen, Stone, Staffs.; A. C. Bossom, London; H. F. Bowen, Brighton; L. A. Box, Cheltenham; J. Boyle, Bolton, Lancs.; F. H. Bramley, Sheffield; S. Bridges, London; H. F. Buckley, Halifax; T. G. Chambers, London; C. P. Chard, Bridgwater; B. C. Chilwell, Wednesbury; G. Church, Warlingham; H. F. Clarke, Manchester; E. E. B. Claypole, London; J. S. Collings, London; F. E. Collington, Nottingham; Ethel May Commin, Exeter; J. W. Corking, Gateshead; R. W. A. J. Cosway, Wandsworth; C. M. Crickmer, London; W. T Curtis, London; W. R. Davidge, Teddington; A. H. Davies, Newport, Mon.; F. Dyer, Manchester; G. L. Elkington, London; G. F. Ely, Manchester; J. Forbes, Middlesbrough; J. L. Fouracre, Plymouth; F. G. Gardiner, Bath; J. H. Gask, Todmorden; A. R. Gradwell, Blackburn; R. Grant, Oban; A. G. F. M. Hall, Peterborough; F. Haswell, Monkseaton; F. R. B. Haward, Great Yarmouth; W. Hemingway, Bolton; G. W. Hilton, Stoke-on-Trent; A. E. Holbrook, Southsea; A. L. Holder, London; H. J. B. Hoskins, Birmingham; I. A. Hossack, Aberdeen; R. Huggup, jun., Alnwick; M. G. Hussey, Cheltenham; M. Judge, London; H. C. Kellett-Smith, West Kirby; W. J. Kennedy, Edinburgh; A. F. P. Knapp, Walthamstow; P. W. Lacey, Derby; E. P. Laycock, Plymouth; N. A. Leech, Maidenhead; J. M. Lethbridge, Highgate; J. McKissack Glasgow; T. C. Marwick, Edinburgh; A. S. Millar, Reading; J. K. Moore, Walthamstow; H. Moss, Manchester: W. J. Nash, Wellingboro'; B. L. Newman, Newport, Mon.; J. Parlett, London; E. H. Payne, Bristol; C. E. Pease, Wimbledon; H. Phibbs, Brierley Hill; B. A. Poulter, Camberley; J. Preece, Cardiff; F. H. Price, Taunton; S. H. Rainforth, Lincoln; W. S. Richmond, Bedford; F. J. Robinson, Bath; T. Salvin, Chesterfield; A. Scott, Glasgow; H. V. Shebbeare, Surbiton; C. H. Simpson, Sheffield; J. B. Smith, Bedford; W. C. Smith, London; C. O. Spencer-Smith, London; A. C. Stair, London; C. Stretton, Leicester; L. S. Sullivan, London; A. Symon, London; G. W. Tod, Edinburgh; S. D. Topley, Lewisham; R. J. Tyndall, London; F. G. Walters, London; P. S. Widdup, Blackburn; G. H. Williams, Huddersfield; J. V. Yorke, Tunstall.

The Intermediate: In Order of Merit.

T. J. Byrne, Kingston-on-Thames; J. Ewing, Berwick-upon-Tweed; T. F. Green, London; A. W. Papworth, London; A. Holstead, Halifax; R. H. J. Mayhew, Anerley; V. R. Gould, London; A. G. R. Mackenzie, Aberdeen; H. A. Wilson, South Shields; R. E. Hemingway, Nottingham; C. H. Reilly, London; J. E. Spain, Wragby; R. S. Cockrill, Great Yarmouth; R. C. Wrinch, Ipswich; W. G. Trew, London; J. Baird, Prestwick; G. Walker, Barrow-in-Furness; L. U. Grace, London; G. H. Norman, Old Ford; S. Smith, Sheffield; E. W. Banfield, London; C. H. Bressey, London; L. W. Clifton, Winchester; A. E. Hughes, London; J. D. Hunter, London; C. S. Joseph, London; W. G. Milburn, Wimbledon Park; A. E. Pickering, Brockley; E. J. Pullar, London; F. D. Smith, Sydenham; A. K. Tasker, North Shields; H. White, Loughton.

The Final.

W. H. Bourne, London; J. Cubbon, Sale, near Manchester; L. W. Green, Datchet; F. R. Hiorns, Margate; J. Kirkland, London; E. F. Knight, London; E. J. Mager, London; H. D. Pearson, Teddington; J. H. A. Phillips, London; G. Reavell, jun., Alnwick; W. A. Scott, Drogheda; V. Steadman, Clifton; H. Tanner, jun., Beckenham; H. I. Triggs, London; J. Wager, Blackheath; A. M. Watson, London.

At the conclusion of the foregoing business, a paper was read, under the management of the Science Standing Committee, by Mr. H. D. Searles-Wood (for Mr. R. W. Gibson, of New York), entitled, "Fireproof Construction of Buildings in the United States," of which the following is an abstract:—

Mr. Gibson's paper commenced with a brief sketch of the development of fireproof construction in the United States, showing that the first efforts had been disappointing through lack of perception of the difference between incombustible materials and fireproof materials. The exposed iron systems had failed signally, collapsing to the heat of burning fittings, furniture, and stored goods. The modern system had developed from these experiences upon an ancient pattern of floors composed of wooden beams buried in masonry, using steel and iron instead of wood, and perfecting and systematising fireproof protection. The latest phase was the entire elimination of the combustible materials hitherto used for doors, floors, architraves, &c.; the selection of materials fire-resisting as well as incombustible, and the use of these to protect others which must not be used unless so protected. Materials most available were steel or iron for strain-bearing purposes, and brick or terra-cotta and plaster to clothe and protect the metal. Masonry materials required careful selection, some granites and marbles being liable to destruction at the earliest blasts of a severe fire. Fireproofing must be such that, when the fire occurs, it will not be washed off by the heavy torrents of water thrown upon it by the modern fire engine. Of the several classes of fire-proofing, accumulated experience pointed to the infinite superiority of fire-resisting terra-cotta, which had always performed the duty required of it. Probably 95 per cent. of existing fire-proof work was of terra-cotta construction. The structural iron work might be divided into three classes, suited to as many types of fireproof buildings. First, the building of ten stories or less, erected by the old methods of supporting walls and superimposed columns carrying floors and roof, and with only small beams and girders or occasional independent trusses. Secondly, the building of more than ten stories, which accumulated such strains upon its walls that they must be reinforced by posts to carry the girder loads, and in which the walls required such mass in their lower parts to support their own upper parts that the metal first introduced to support the floor girders was reinforced and called upon to support the upper walls. This was the so-called skeleton construction. At a height exceeding twelve stories, or when exposure to wind and other strains was great even at this height, the ordinary attachment of columns and girders was abandoned, and horizontal stability supplied by the rigid riveting of all connexions of posts one upon the other, and of girders to posts and beams to girders, and by the addition of bracing in ties and struts and gusset brackets, thus developing the so-called cage construction, wherein the steel receives and transmits all loads to the foundations; and the walls have become mere panels, not only without vertical loads, but without transverse bracing strains. Thirdly, an intermediate type of building where all the internal structure and all the floor loads were supported upon columns, some being placed in the outside walls, the outside walls being made of self-supporting thicknesses in cases where architectural treatment demanded sufficient mass for the purpose, and where the foundation presented no difficulty. In buildings of the third type, erected in many stories and let for business purposes, almost perfect fireproof qualities had been achieved. In such buildings there was no danger to life from fire, or of the fire spreading from the room where it first occurred. This type had become systematised by custom and experience, so that its structure was uniform throughout the country. The floor loads are supported upon columns of rectangular shapes of rolled steel, the outer columns being set in the outer walls in grooves, close-fitting but without bond, so as to permit of unequal movements and settlements and contraction. Girders are of rolled steel, built and riveted for large sizes, and of I-beams for smaller (24 in. and under); they are all riveted to the side columns, so that these may be continued right through the height of the building in practically one length. Bracing is done with gusset plates and angles. Beams supporting the floors are small (8 in. or 9 in.) rolled steel I-beams, laid 4 ft. 6 in. apart. The size of the beam and spacing arise from the use of the terra-cotta arch, of from 8 in. to 10 in. in thickness. These arches, which are very economical, very adaptable, and elastic in their application, are made of hollow terra-cotta blocks, with joints inclined at a fixed angle. The blocks are of three patterns, viz., the springer, which rests on the flanges of the floor-beam; the intermediate blocks, which are all cut to the same inclination; and the key-block, with the sloped joint on both sides. The work is set upon a centring consisting of simple scaffold boards hung 1½ in. below the soffits of the iron beams; upon this centring the arch-blocks are laid, and then jointed and flushed in cement. When the work is set the centring is removed to a new panel, so the work goes on continually. Upon the arches a layer of cinder concrete is deposited, and upon this the finished floor, consisting of paving or tiling, or a composition of a concrete nature, or sleepers and wooden floor. For buildings having floors weighing from 75 lbs. to 95 lbs. dead load per foot, and supporting live loads from 75 lbs. to 150 lbs., the distance between the main girders would be between 14 ft. and 18 ft., which being a convenient size for a single office is also taken as the unit of room width and the space allotted in the outer walls to a pair of windows. The roof is constructed with arches, the same as the floors, except that sometimes

the steel beams are laid to the necessary pitch of about ½ in. to the foot, so as to avoid the weight and expense of filling, which would be necessitated by level beams and arches. The thickness of the walls is about two-thirds that required for walls supporting the floor loads, and they are secured to the metal framework so as to receive its assistance in resisting horizontal wind pressure. Thicknesses of walls for buildings of varying height and construction were quoted. The thickness necessary to resist the weather is found to be 12 in. at least of brickwork, with terra-cotta interior furring. The furrings are hollow terra-cotta slabs or tiles 2 in. thick, and 16 in. by 8 in., or other convenient sizes, built up against the inside face of the wall and secured with iron where necessary. The interior of the steel frame is protected over all its exposed surfaces by 2 in. of terra-cotta furring. The girders are protected by slabs of terra-cotta, secured with hooks and bars and wiring, and usually getting their outer form by means of metal lath upon light iron bracketing to receive the finished plastering. The lower portion of walls and columns are frequently finished with marble slabs 1 in. thick, or with tiling. Those methods are preferable which place the fireproofing material close to the metal and preserve numerous and frequently broken air spaces in their own substances. A greatly improved and considerably cheaper column protection can be made by using one coat of metal lath and cement in contact with the column, and a second coat furred out from the first upon metal lath upon light iron bars, so as to preserve an air space between the two thicknesses of cement. This protection is finished with hard plaster, proof against the fire-hose. Partitions are built after the structural steel is protected. The best are of terra-cotta blocks, 4 in. thick for average heights, 3 in. for moderate heights, and 6 in. for great heights of story. They may be stiffened with angle iron framing, but show extraordinary strength when well set in Portland cement. Minor partitions, and sometimes all the partitions except those next corridors, are frequently built by using light angle iron posts or quarters covered with metal lath, and plastered either like the old-fashioned wood plastered partitions, or something with very thin posts and one sheet of metal lathing only, so as to make a solid plastered partition about 2½ in. thick. Three-inch tile partitions dry quicker and cost only a little more. So far the building has nothing combustible in its construction, and the tendency is to more and more reduce the amount of woodwork admitted after this stage. Wooden floors are permitted, but doors and architraves should be of sheet metal, wooden cores being tolerated. Window architraves and jambs should be of hard plaster, and window-frames and sashes of chemically-treated fireproof wood or of metal. Windows in internal partitions and doors should have wired glass. Office furniture should be non-combustible, *e.g.*, metallic book-shelving, desks, cabinets, letter files, &c. In ordinary fireproof buildings, halls, stairs, corridors, and elevator shafts are entirely incombustible. The author next discussed the principal sources of fire, and the manner in which it spreads—the latter a point but little understood, except by firemen; the effect of heat upon metal; an alternative system of steel construction; various forms of floors in use, and the merits of porous terra-cotta, a material preferred by many experts. In conclusion the author dealt at considerable length with the principles to be applied in calculating the strength of beams, girders, columns, and foundations in proportion to the loads required to be borne, quoting the building regulations respecting the matter in New York and Chicago, and the differences of opinion and practice existing among architects there in regard to column and foundation loads. The author's own calculations for a first-class bank and office building designed by him and recently erected in Syracuse were given as follows:—

Load on all beams = total dead load + 70 lb. per ft. live load.
Load on all girders = total dead load + 60 lb. per ft. live load.
Load on columns of three upper stories = total dead load + 60 lb. per ft. live load.
Load on columns of remaining stories = total dead load + 40 lb. per ft. live load.
Load on foundations = total dead load + 20 lb. per ft. live load.

Among a large number of illustrations to the paper were a set of working drawings and specifications and strain and load diagrams of the Syracuse bank designed by Mr. Gibson, which afforded an interesting example of this class of practice in the United States. Photographs showing the building in course of erection at various stages were shown by the lantern. A series of lantern slides were also shown reproducing details of construction of a thirty-story building which appeared recently in *Engineering*.

Mr. Percival Gordon Smith remarked that, as Chairman of the Science Committee which initiated this paper, he thought he might claim it as an extremely practical one. He believed that those concerned with the erection of large buildings in England would find in it much that was useful. He did not, of course, pretend to say that they would ever arrive at the time when those twenty or thirty-story buildings would be acceptable in London. The point that occurred to him as being the most difficult was as to the method of controlling these buildings so as to ensure reasonable security. He had himself been trying to master the amended Building Law of New York. He had not succeeded in doing so, and it came to him as good news that the law was under revision. Certainly the Act seemed to him a terrible document. One clause occupied some eight pages, and was so complicated that he could not understand it, and how the Americans did he could not imagine. It was sent over with the paper, though he was not in a position to say whether Mr. Gibson presented it to the Institute. He proposed a vote of thanks to Mr. Gibson for his paper.

Professor W. C. Unwin said he had seen the buildings with which the paper had dealt, and during the World's Exhibition in Chicago he had long conversations with two or three architects who had mainly developed this system of construction. First of all he would point out that the question intended to be dealt with in the paper was not the "sky scrapers" alluded to—they had, strictly speaking, nothing to do with the policy of building vertically instead of horizontally. At the same time it should be pointed out that this class of building was the outcome of the social and business habits among the Americans, of which Englishmen were no judges. One building he saw in Chicago was of fourteen floors, containing something like 100 offices. On a moderate computation something like 7,000 persons would be constantly in that building during business hours. In fact, American business habits seemed to make it very convenient that a large number of persons should be within reach of each other rather than in different buildings or different streets, But quite apart from the policy of high buildings they had the question of iron construction and its strength when masked by masonry or brickwork. In the latest type of the American big building they had absolute steel construction; every particle of strain of that building went directly on the steel structure. The walls were mere panels, and they became thinner as the floors went up. There could be no doubt that this was a system of which we had no example in this country. Yet it had been made successful. The first difficulty that occurred to one was the difficulty arising from expansion and contraction of steel. That, however, had been found no serious difficulty at all. True, in Chicago difficulties were encountered which were not met with elsewhere, because such buildings were put on the very worst foundations—even 10 ft. or 12 ft. below the ordinary level of the town. Even from that there were instances of settlements of 4 in.—one settlement was, he believed, as much as 8 in., and there were instances spoken of of 15 in. In general they secured the uniform strength of iron concrete foundations by two fundamental conditions—first, that the pressure per square foot of the foundation should be uniformly distributed and not to exceed 3,000 lbs. or 3,500 lbs. per square foot, and secondly, that in each foundation block resultant pressure should pass from the centre of gravity of the block.

Mr. Lewis Solomon, in seconding the vote of thanks, said he was asked to make an examination of the specification of the building they had heard described by Mr. Gibson. What struck him most was its completeness. A list of all the stanchions and girders was given, there was a complete specification of all electric light work, and of the heating radiator. Going into the details, many things struck him. There was the use of Portland cement in the proportion of 1 to 2 of sand; that in England would be regarded as positive waste. Then the bond was different from that worked at home. Mr. Gibson specified that the bond was to have two headers every fifth course—a thing that would be very much grumbled at in England. Another thing that struck him was the enormous amount of copper work provided for; that we in England were not used to. Lately there seemed to have been introduced an enormous quantity of copper work, and he might mention the Luxfer prisms, where the glass was kept together by a deposit of copper. The flooring, they would find, was mostly ironwork, seven-eighths of an inch thick, which they could not agree to in England. Then the specifications went on to provide for the glass—the best French plate glass. They never heard of French plate glass in England. It was either English or Belgian. It was unusual also for them to paint their brickwork, as was provided for in these specifications. In regard to names, too, the Americans used "masonry," where in England would be brickwork; they used the word "chutes" in cases in which we used "shoots"; they talked about vault lights where we should say pavement lights. With regard to the diagram that had been exhibited, there were several useful features in calculating the weights and the strains, the sizes of the girders and other working which was far preferable to our custom of calculating them on paper.

Mr. R. Gifford Read said the paper gave them a very good idea of the American way of building high structures, and showed how different the Americans were from us in their regularity in going to work, and their application of strictly scientific principles. He had had the good fortune to work out the construction for several gentlemen who, he dared say, were members of that Institute, and he ventured to suggest that they should take the bull by the horns, and let the engineer design the steel work. No doubt they had found much bother between the ironwork men and the brickwork men; but the Americans by the plans they adopt stood a very good chance of avoiding that trouble. The proposed object of the paper was to assist in solving the fireproof construction problem. Very little, however, had been said about that; and he might give it as his experience in regard to floorings, that in five or six large warehouses with which he had been connected, the fireproof floorings had been laid on joists with a thickness of concrete of only about 4 in.

Mr. Langton Cole inquired whether the terra-cotta referred to in the paper was to be obtained in London; likewise the wire glass. He had endeavoured to get the latter, and was informed by the firm that they did not make it larger than 2 ft. square, whereas he wanted it 6 ft.

Mr. Lewis Solomon replied that the wire glass could be obtained in London from Pilkington.

Mr. C. H. Brodie remarked that the terra-cotta used for fire-proof floors in the States was of a comparatively soft and porous composition. With regard to the paper that had been referred to, it was something very similar to the Willesden paper. It was largely used in the American frame houses. Mr. Solomon had spoken of the immense amount of copper used. That, he might explain, was taken up by the immense amount used on the roofs. All these huge buildings had flat roofs, sometimes covered with copper, soldered; and, whether in the arctic temperature attending a blizzard, or the intense heat of the summer, they stood thoroughly water-tight. He did not know whether the specification spoken of by Mr. Solomon mentioned tin for roofing, but there was one in the Library which did.

Mr. Max Clarke thought it should be clearly understood that the term terra cotta referred to by Mr. Gibson in his paper was the hard or solid material, not the porous variety mentioned by Mr. Brodie. The latter was noted in the paper as being better, probably, in many ways than the hard variety, but was not in such universal use, and, in some localities, was more expensive. Messrs. Doulton had made terra-cotta flooring blocks; but, as far as he knew, they could not be procured at once in any quantity in this country.

A member said that with regard to tin roofs he had specified some hundreds of them, they were simply tin tiles.

Mr. Delissa Joseph said that practical application of the principles laid down were very appropriate in the United States, but in this country we should never have the opportunity of building so high as in America; consequently steel

frame construction did not seem to raise such important issues. As to fireproof construction, he questioned whether their capitalists would be induced to build more expensively in that direction so long as the fire insurance companies refused to give assistance or encouragement. After the Cripplegate fire the Goldsmiths' Company arranged a conference with the fire insurance companies to see whether arrangements could be made to adopt, in rebuilding, fireproof principles, and whether the companies would consequently reduce their rates. There were many meetings between the representatives of the insurance companies and the architects, but they came to nothing, because the insurance companies, having put their heads together, insisted that their excessive rates should be maintained. It was then suggested that the companies should define what they regarded as a model fireproof building; but they refused to give themselves away to that extent. As a matter of fact, however, he, in the interests of his clients, introduced a reasonably fire-resisting building, yet it was doubtful whether the insurance companies would lower their extravagant rates when it came to insuring it. So long as this monopoly was maintained, so long would the development of fire-resisting building in London be discouraged.

The vote of thanks having been carried, the President announced that the next meeting of the Institute would be held on December 19, when the following papers would be read :—(1) "The Application of Electric Power to Practical Purposes in Buildings," by Mr. H. R. J. Burstall, M.Inst.C.E.; (2) "Some Practical Hints on the Production and Use of Electricity for Lighting Country Houses," by Mr. Bernard M. Drake, M.I.E.E.

The meeting then terminated.

Tea and Smoking-Room.

Arrangements have been completed for supplying light refreshments at No. 9, Conduit-street between the hours of 2 and 8 p.m. The room is provided with writing materials and periodicals, the files are kept of the *Times*, *Punch*, *The Graphic*, &c. The Council have made these arrangements in the belief that if some of the minor conveniences of a club were added to the Institute, the result would be welcome to a great number of members.

MAGAZINES AND REVIEWS.

THE *Art Journal* contains views and a plan of the Carnegie Art Gallery at Pittsburgh; a building which, unlike most art galleries, includes also a specially-designed music-room in semi-circular form—not the best form for a music-room, unless very special means are taken to deaden or destroy echo. The interiors of the picture galleries present much the usual appearance of the conventional picture gallery—rather low walls with a cornice and a cove. Mr. Francis Watts' article on Piccadilly contains some good remarks in an architectural sense; one of the illustrations (by Mr. C. Pears) is entitled "Foggy Piccadilly," but the title might apply to pretty nearly all the sketches. This habit of showing only a few faint indications of a scene renders sketching an easy business, but it is an affectation. An article on "Saltaire" bears the signature of the late Mr. Gleeson White. Mr. Fred. Miller's "Cunning Work for Clever Hands" article deals this month with inlaying in coloured woods and stained wood decorations. The illustrations are piquant, but some of them rather too angular in line for our liking.

The *Magazine of Art* devotes considerable space to the work of that gifted and original artist Mr. H. J. Draper, with a number of illustrations of his pictures and figure-studies, which fully bear out the recognition expressed for his qualities as a painter of the ideal. The etchings of Herr Max Klinger, which form the subject of the next article, represent a far less wholesome form of the ideal in art, though his "Eve and the Future" is a beautiful work. "Turkish Artist Scribes of To-day" is an unusual subject of some interest. Mr. Spielmann continues his "Coincidences and Resemblances in Works of Art"; of the "resemblance" in the three reading Magdalenes, by Correggio, Battoni, and Füger, there is no doubt, but we should hardly call them "coincidences." That between Rubens's "Chapeau de Poil" and Uwins's "Chapeau de Brigand" is very far-fetched; besides, it is known that Uwins's picture was simply suggested by a little girl who was sitting for her portrait, and who in his absence from the studio had amused herself by dressing in some of the property costumes kept there for use in pictures; the story was told many years ago in the *Art Journal* of that day, when an engraving of the picture was published. Nor can we see any resemblance or coincidence between the two pictures of "La Rixe," by Ter Borch and Meissonier. The attitudes in two boy portraits by Lawrence and Millais suggest that the latter painter had Lawrence's work in his mind, either consciously or unconsciously.

In the *Studio* (November 15), "The Illustration of Music" is a new and interesting subject, though these are not so much symbolical illustrations (as the title seems to imply) as decorative covers and page-headings. Mr. Pomeroy's work forms the subject of an illustrated article, as also the work of Mr. Christopher Dresser, which gives occasion for a number of very diverse illustrations of decorative design. Among others there is for once a design for a knocker which really seems as if it was intended to knock with. The *Studio* has had amongst its competitions one for the best design for a "picturesque cottage"; at least we presume it was for design, but the examples given all look like sketches of old cottages. Why not try for a picturesque cottage which suggests a modern and not an ancient building? Perhaps because the problem is a good deal more difficult.

The plate illustrations in the Boston *Architectural Review* look like a series of experiments in architecture; a design for a Roman Catholic church at Oyster Bay, by Messrs. Ingle & Almirall, in ecclesiastical Gothic, with a mixture of large rubble work and half-timber in the walling; a house at Wenonah, by Mr. W. L. Price, somewhat like a French "Maison de Campagne" (but without the spikes); and a competition design for the Jersey City Public Library, by Mr. Freedlander, in a heavy and very modern-French type of Renaissance. We cannot call any of these very satisfactory designs, and their collocation implies a great absence of definite aim in American architecture. The principal article in the number consists of some "Notes on the Architectural Work of Charles Garnier," by Mr. J. R. Coolidge, with illustrations of some of Garnier's work. The article is a very just and well-reasoned criticism, recognising without exaggerating the faults in taste of Garnier's style, while admitting his remarkable power and facility. "None of his work is of great popular interest or of exceptional importance" (his works other than the Opera House, that is), "but all of it is of the same quality of architecture as the Opera, with the same dominant excellencies and defects. Garnier's skill in composition, directness of expression, readiness of invention, and completeness in execution, never forsook him, and his taste in detail steadily improved though it never became wholly refined." It is curious what a contrast there is, however, between the style of the Nice Casino—which once received the unintentional compliment "It looks exactly what it is—a gambling-house," and the severe and restrained style of the house which Garnier built for himself. Garnier knew what his public wanted, both at Paris and at Nice; and it seems to have been not exactly what he would have wanted himself.

The *Engineering Magazine* contains an article on the interesting subject of "The Suspension Bridge—Old and New." The writer, Mr. Gustav Lindenthal, takes a very favourable view of the suspension bridge in an economical and constructional sense, and suggests that the system is of more general applicability than it has hitherto been considered. The article contains an illustration and some account of the proposed North River bridge for New York. The number also contains a paper on "The buildings at Oxford from an engineer's point of view," by Mr. J. W. Parry. This is certainly a new point of view for Oxford, and there is some interesting discussion as to materials and construction, together with remarks on the architecture, some of which are delightfully naïve, and some still more curious blunders on matters of fact. Mr. Parry appears to suppose that the system of hanging a peal of bells to swing in different directions, so as to distribute the pull on the walls, is something exceptional; and he tells his readers that the top of the spire of St. Mary's is 189 ft. from the ground, "the same height as that of the spire of Salisbury Cathedral" (!). The height of Salisbury spire is somewhat over 400 ft. This is a blunder so absurd, and withal so easily avoided, that we should think this contributor would hear from the editor when the latter finds out what he has been betrayed into printing. The paper on "Shop Cost Keeping" will be of interest to contractors and manufacturers.

In the *Artist* the "Talks of Three" are continued, and the subject of the Constitution Hill arch, still without its quadriga group, is pertinently touched upon. Mr. Adrian Jones's quadriga group, "Triumph," is illustrated as a very fitting work for the position. We wish it could be placed there. The illustrations of "Types of Design from Berlin and Vienna," and glass and ceramics in Sweden, are of interest.

In *The Antiquary* Sir Stephen Glynne's "Church Notes" are continued, dealing with Tamworth, Ashby-de-la-Zouche, and Nottingham. The remarks in the "Notes of the Month" as to the damage done to Southwell Minster by the restoration are utterly absurd, and can only be regarded as the voice of the blind prejudice of the antiquarian spirit, which thinks that a church in use is to be regarded in the same light as an abandoned castle. This kind of exaggeration may appeal to the archæological clique, but it will not raise the influence of the magazine with people who can see both sides of a question of this kind.

To the *Fortnightly* Mr. and Mrs. Pennell contribute an article on the "Centenary of Lithography," commencing with the remark (not uncalled for) that while in general centenaries only occur once in a hundred years, in lithography they happen whenever they are wanted. The article is mainly a historical sketch, mentioning the names of a number of English and Scotch lithographers and lithographic artists, and not mentioning either Charlet, Raffet, Méryon, or M. Fantin-Latour. The omission of the latter may be because it was not within the scope of the article to deal with living artists; the omission of the three former is absurd.

In the *Révue Générale* the illustrated artistic article is this month occupied with Florence, with illustrations chiefly of its architecture; one can hardly suppose, however, that such a subject is to be dismissed in one number. The article, by M. Arnold Goffin, treats the subject from a special point of view, studying the character and history of the Florentines as bearing upon their art.

Harper is entirely occupied with stories and war articles. *Scribner* is also very warlike, but includes an illustrated article by Mr. Spielmann on "John Ruskin as an Artist," a subject with which we have the fullest sympathy, having always considered that Ruskin's gifts as an artist (especially in the treatment of architectural subjects) have been as much underrated as his critical faculty has been overrated. Mr. Spielmann does justice to his artistic powers without exaggerating them; the article is one that should be read by all who are interested in art. Under the heading "The Field of Art" are three short articles, signed by different initials, on a subject on which we have several times commented—viz., the determined attempt to Gallicise American architecture on the École des Beaux-Arts models. As one of the writers says, it is indisputable that Paris is a handsomer city than New York, "but it does not follow that the way to beautify New York is to multiply examples of Parisian architecture." All three essayists are opposed to this Gallicising movement, and we are glad to find that some people in the States seem at last waking up to a perception of the mistake.

The *Century* is also largely occupied with war and the destruction of the *Maine*, but at the commencement of the number there is some pretty decorative work in connexion with a Christmas Eve poem, followed by another decoratively treated poem with some effective illustrations.

The *Nineteenth Century* contains an article by Sir J. C. Robinson on "Reorganisation of our Art-Museums" and one by Mr. G. Shaw Lefevre on "The London Water Supply," but what is the special value of the opinion of either writer on his subject may be a matter of question.

The *Contemporary Review* contains a short but very ably-written and discriminating estimate of Puvis de Chavannes, by Mr. C. J. Holmes, whose name is new to us as a writer on art, but who knows what he is talking about. The special qualities of the late artist as a mural painter, and the reasons for

the treatment of his pictures, in regard to design and colour, for that special object, are very well pointed out. In the same number is an interesting article by the Rev. John M. Bacon on "Scientific Ballooning," a *résumé* of what has been done and remains to be done.

To the *Pall Mall Magazine* Mr. F. Wedmore contributes an article on "A great French etcher," Méryon to wit; with some reproductions of his etchings of Old Paris—the Paris of Balzac, including the powerful one of "The Old Morgue," and a characteristic old house in that east-end street with the delightfully suggestive name "Rue des Mauvais Garçons." The experiment of illustrating a short narrative by photographs of the same person with different expressions and attitudes, which has been tried before in this magazine, is repeated with considerable effect in the photographs of Miss Irene Vanbrugh which accompany the article "A Peculiar Attack"; this deserves recognition as a new and rather interesting method in illustration, the person photographed in reality designing attitudes and expressions of face as an artist might design them.

The *Indian and Eastern Engineer* (Calcutta and Bombay) is a monthly publication which has not before reached us, though we see it is in its second volume. It contains a good deal of engineering information and illustration, and an article on Indian bungalows, as usually constructed and planned, which is of some architectural interest. It is suggested that the normal Indian bungalow is generally very badly planned, and might be much improved. A number of plans are given.

The Quarry contains an article on the "Hopton Wood Stone Company" which may interest architects, who are rather inclined to make an increased use of this stone.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of this Council was held on Tuesday in the County Hall, Spring Gardens, Mr. T. McKinnon Wood, Chairman, presiding.

The Works Department.—On the reception of the report of the Finance Committee,

Mr. T. B. Westacott inquired when the Council might expect to have the statement of the works executed by the Works Department for the half-year ended September 30 last, and whether it was true, as stated in a newspaper, that there had been a loss of 22,000*l.* on the construction of the Lewisham sewer?

Lord Welby, Chairman of the Finance Committee, in reply, said the statement was ready and would be presented next week, when the reports of the executive committees had been received. The statement would contain full information with regard to the Lewisham sewer.

The Superintending Architect.—The report of the General Purposes Committee contained the following paragraph: "On October 25, the Council, in view of Mr. Blashill's retirement on December 31, gave instructions for an advertisement to be issued inviting applications for the appointment of a Superintending Architect at a salary of 1,500*l.* a year. In response to the advertisement twenty-seven applications were received. The applications having been carefully considered, and nine of the candidates having been seen, we regret to have to report that we cannot see our way to submit the names of any of the candidates as possessing, in our opinion, the qualifications necessary for so important a position. We are considering what course should, in the circumstances, be taken with a view to filling the appointment."

Mr. Dew asked if, in view of the difficulty of finding a suitable successor to Mr. Blashill, the Committee would consider the advisability of dividing the work of the Architect's Department, and appointing two officials—an architect and a surveyor?

Mr. Strong, Chairman of the Committee, said that the question had more than once been considered by the Committee, and they had decided that it was far better to have one head of the department, rather than two, as suggested. He did not know if the Committee would again consider the suggestion; it had previously been well considered and a definite decision had been come to.

Fire Station, Wapping.—On the recommendation of the Fire Brigade Committee, it was agreed—

(a) That the estimate of 11,000*l.* to be submitted by the Finance Committee be approved, and that a fire-engine station be established at Wapping.

(b) That the proposed Wapping station be erected on the site of Nos. 45, 47, 49, 51, 53, 55, 57, and 59, Red Lion-street, and that the Fire Brigade Committee be authorised to make the necessary preliminary arrangements for the acquisition of the premises and the erection of the station on the site thereof.

Science and Art.—The General Purposes Committee brought up an urgency report containing a letter from the London School Board with reference to a notification being sent by the Technical Education Board of the London County Council to the Department of Science and Art of the Board's willingness to be responsible for the Science and Art instruction within the County of London. It recommended:—"That the proposal of the School Board for London that a conference be held between the Council and the Board be acceded to, and that the following members be appointed to represent the Council at the proposed Conference, viz.:—The Chairman, Vice-Chairman, and Deputy-Chairman; the Chairman and Vice-Chairman of the General Purposes Committee, the Chairman and Vice-Chairman of the Technical Education Board, Mr. Cornwall, Mr. Dickinson, and Colonel Legge." This was adopted.

Holborn to the Strand Street.—The Improvements Committee recommended: "That the Parliamentary Committee be instructed to make provision in the Improvements Bill for the next Session of Parliament for the acquisition, in connexion with the re-housing of persons to be displaced by the formation of the new street from Holborn to the Strand, of land (1) in St. Pancras, bounded on the east and north-east by Packenham-street, on the west by Arthur-street, and on the south by Wells-street, comprising the premises occupied by the London Improved Cab Company; (2) in Holborn, bounded on the north by Holsworthy-square, on the south and east by Little Gray's Inn-lane, and on the west by Gray's Inn-road, comprising the premises of the Holborn Union Workhouse; and (3) in Lambeth, on the north side of Palmer-street, between Cornwall-road and St. Andrew's Church, and on the east side of Cornwall-road, between Palmer-street and the passage known as Peer's-cooperage." Mr. Shaw-Lefevre explained that in regard to the Lambeth site fifty people would have to be displaced, but they could easily obtain accommodation in adjacent houses. The recommendation was adopted.

Hampstead Heath Extension: Golder's Hill.—The Parks Committee recommended that the Council do resolve that no portion of the land at Golder's Hill Estate shall be let for private use, and that the house shall only be let as a refreshment house, or for some other public purpose; and that the Parliamentary Committee do take steps to obtain an amendment of the terms of the Bill to be brought before Parliament with regard to this matter, so as to provide for such use of the property only; and that the Vestry of Hampstead, the Golder's Hill Acquisition Committee, and other bodies be informed accordingly.

Mr. Shaw Lefevre said they had an opportunity to let the house, kitchen gardens, library and stables at a rental of 600*l.* a year; were the house used by the Council it would cost the public 300*l.* or 400*l.* The difference between the two proposals would, therefore, be about 1,000*l.* a year. The amount received in rent would pay the interest on the money contributed by the Council towards the purchase of the estate.

Mr. Burns, M.P., strongly objected to the suggestion, and Mr. Bond, M.P., Lord Meath, and others supported the recommendation of the Committee, which was agreed to.

Drinking Fountains and Troughs.—The same Committee recommended, and it was agreed, that the Council do undertake in future the care and maintenance of all the drinking and other fountains at parks, gardens and open spaces, and do defray the cost of the supply of water to the same; and that the Metropolitan Drinking Fountain and Cattle Trough Association be informed of this decision.

The Housing Question. — The following adjourned report of the Housing of the Working Classes Committee was then considered:—

"We now proceed to consider the far larger and more important question of the course to be pursued by the Council in the matter of *housing*. Apart from the re-housing of persons displaced by improvement schemes which the Council is by statute required to carry out, it has not hitherto put in force the powers which it possesses under Part III. of the Housing Act, to buy land and build thereon for the purpose of increasing the supply of house accommodation in or near London.

It is true that the Millbank estate was purchased under those powers, but at the time of purchase the Home Secretary was consulted, and agreed that dwellings erected thereon should be taken as providing accommodation for persons displaced by improvement schemes within a radius of two miles from that site. By far the larger portion of this estate has been already allotted for the erection of dwellings to accommodate persons to be displaced from the Clare Market area, and in connexion with the formation of the new street from Holborn to the Strand. We have now to consider whether the Council should buy land inside and outside the county, and build thereon for the purpose of adding to the housing accommodation in London. As this would be an entirely new course we think that we should obtain the sanction of the Council before we occupy the time of the officers in seeking for available sites and entering into negotiations as to cost.

There is no doubt that housing accommodation is at present deficient in London. The census of 1891 disclosed the fact that 214,843 persons lived in tenements of one room; that 128,000 persons, in families of from four to twelve persons in each family, were living with only one room to each family; and from the deputations which have appeared before us, and the resolutions which have been sent to us by local authorities, we gather that this overcrowding is even more excessive now than it was in 1891.

There are several causes which continually tend to increase this evil. First, the area of land required for commercial purposes, factories, and warehouses is continually extending to a wider radius from the centre, and it is desirable that it should do so and supply means of livelihood to a greater number of workmen. In this process of expansion, however, small house property, the dwellings of the working-classes, is destroyed, and builders find it unprofitable to pay the commercial value of land in such districts, and to build working-class dwellings thereon. In some other parts of London small dwellings are being destroyed to make room for large blocks of highly-rented flats and mansions. These causes are continually operating to lessen the number of houses available for the accommodation of the workers in the more central parts of London. On the other hand, the remarkable rise which has taken place in the cost of building has tended to discourage the erection of dwellings in the central districts. The artisans' dwelling companies, with the exception of the East End Dwellings Company, which is still doing very useful work, have almost ceased building for some years, and no dwellings of this description are being built by private individuals."

As an example of this increased cost of building we may mention that when the Council first made contracts in 1890 brickwork was priced at 11*l.* per rod, it is now priced at 20*l.* 15*s.* per rod. We are informed that this is owing to three causes—the rise in the price of materials, the rise in wages, and the much smaller number of bricks laid in a day by each workman.

In strong contrast to the cessation of building of workmen's dwellings in the centre of London is the very remarkable increase in the number of cottage dwellings which have lately been erected in some districts outside the county. This is especially noteworthy along the Great Eastern Railway, where, owing to low fares and a good service of trains to and from the centre of London, many thousands of cottages have been erected. Many of these have two rooms on the ground floor and three rooms above, and are let at about 6*s.* 6*d.* per week. The demand for cottages in this outer circle depends much upon the means of cheap and rapid access to and from the centre of London. There are vacant sites much nearer to the centre than those referred to above, but to and from which access is difficult for workmen owing to high railway fares and a slow tramway service. If the Council were to build upon such sites, there would be no relief to the overcrowded districts of the centre until proper means of cheap and rapid transit were supplied.

It would, therefore, be our first duty to consider, in co-operation with the Highways Committee, how such sites could be made easily accessible to the workers of the central districts.

It must, however, be borne in mind that the financial difficulty which we find so great when we build under Part I. of the Act will be much greater when we come to build on land bought under Part III. Under Part I. the land, when cleared of houses, is written down in value to the price it would sell at when earmarked for workmen's dwellings, but under Part III. we have to pay the full commercial value for land, and it will not be possible to build in compliance with standing orders unless the Council is prepared to lower its present high standard of building. We have obtained much interesting information as to dwellings erected, or about to be erected, in Liverpool, Hornsey, and Richmond, which we send herewith.

The Council has hitherto expressed an opinion against the policy of building houses of an admittedly inferior type, but if the Council desires to

house the poorest classes in central London it will have to approach more nearly to the Liverpool standard. In the outer circle also cottages will have to be built to a standard more nearly resembling that of the dwellings with which they will have to compete. In building under Part III. there is no obligation to submit plans to any Government department.

It is, we think, generally admitted by the Council that in building to supply houses when under no statutory obligation to do so there should be no charge on the county rate. In this opinion we entirely concur, and we think that the Council should make experiments in a cheaper form of building than it has hitherto seen its way to adopt. We recommend—(*c*) That, apart from the re-housing required in connexion with clearance or improvement schemes, the Council do approve of action being taken under Part III. of the Housing of the Working Classes Act, 1890, with a view to the purchase of land and the erection of dwellings thereon for the purpose of supplying housing accommodation."

Last week Sir Arthur Arnold moved that the recommendation be referred back to the Committee for further consideration.

Mr. Antrobus seconded.

Mr. H. R. Taylor, referring to the increased cost of buildings, admitted that bricklayers to-day did not do so much work in a day as they did twenty years ago, but what was lost by quantity was gained in quality. It was unfair to compare the cost of work of to-day with the work of twenty-five years ago. The modern architect put as many angles and corners as he possibly could into his building, and this meant increased cost in labour. The price of materials had also gone up from 50 to 60 per cent.

After a long discussion, the Council divided, with the following result—For the amendment, 36 ; against, 78.

Sir J. Dickson-Poynder, M.P., moved the substitution of the following words—"in anticipation of or" in place of the words of the recommendation "apart from the re-housing required."

Sir Arthur Arnold seconded the amendment, which was defeated.

Lord Monkswell moved, and Mr. Verney seconded, the insertion of the words "provided no charge be made on the county rate thereby."

This was agreed to.

Mr. Howell Williams then moved that after the words "purchase of land" the words "within or without the county of London" should be inserted.

The amendment was negatived.

Mr. C. H. Campbell then moved that after the word "thereon" the following words should be inserted—"and also with the view of purchasing or leasing suitable houses already or hereafter to be built or provided."

This addition having been seconded, was agreed to.

Mr. Balian moved the insertion of words which would enable the committee to buy land upon which buildings already stood, but this, not being seconded, dropped.

Mr. Beachcroft then moved the addition of the following words :—"upon the understanding that when land is so purchased it shall be open to the Council to either lease or sell it for the purpose of erecting working-class dwellings ; and that it accordingly be an instruction to the Housing of the Working Classes Committee to submit at the proper time a recommendation for legislation to effect that object."

Colonel Legge seconded the amendment, but on a show of hands it was negatived.

The recommendation of the committee, as amended, was then agreed to.

Millbank Estate—Plans of Dwellings.—The same committee reported as follows, the recommendation being agreed to :—

"In 1889 the Council passed a resolution adopting certain regulations as to the minimum requirements which it should impose on itself and others in building working-class dwellings to replace those destroyed by its improvement schemes. These regulations require that—

Living rooms should have a net superficial floor space of at least 144 sq. ft.

Bedrooms should have a net superficial floor space of at least 96 sq. ft.

In addition to these rules we have to conform to regulations as to through ventilation which have been fixed by the Council's medical officer and the Local Government Board. These health regulations preclude us from building on the less costly plans adopted by the artisans' dwellings companies, who are merely required to conform to the London Building Act, 1894. From time to time we have increased the size of the rooms which we provide, and have recently built dwellings with living rooms of 160 sq. ft. floor space, and bedrooms 110 sq. ft. floor space. As the Council is aware, we are in course of erecting dwellings on the Millbank estate, which will be accepted by the Home Office as providing accommodation for some of the persons displaced by either the Clare-market improvement scheme or the formation of the new street from Holborn to the Strand. So far as we have gone we have planned these dwellings so as to give the large floor space referred to above, with the result that the rents will be fixed at 7s. 6d. per week for a self-contained tenement consisting of a living-room, bedroom, scullery, and water-closet. We are now considering the plans of other dwellings to be erected on the estate, and as we are very anxious to keep the rents as low as possible, we have asked the architect to consider the cost of rooms planned on the smaller measurements prescribed as the minimum in 1889. On the basis of the smaller measurements we find that a rent of 7s. per week will be required for a self-contained two-room tenement, as against 7s. 6d. per week for a tenement with the larger rooms. The tenants on the Clare Market area are, in many instances, paying 4s. 6d. per room per week for very inferior accommodation ; but they are permitted to overcrowd, whilst under the Council only two persons per room are allowed. We think that the experiment of the smaller rooms might be tried for two blocks on the estate. We submit the sketch-plans, and we recommend that the sketch-plans of two blocks of dwellings to be erected on the Millbank estate, showing living and bed rooms of an average size of 147 and 100 sq. ft. respectively, be approved."

Paddington Coroner's Court.—The Joint Committee on Coroners' Courts and Mortuaries reported as follows, the recommendation being agreed to :—

"On July 26 last the Council sanctioned an expenditure of 3,900*l.* for the erection and furnishing of the Paddington Coroner's Court and for incidental expenses, and resolved that if the manager of works was not satisfied with the architect's estimate of 3,750*l.* for the construction of the court, tenders should be invited for the carrying out of the work. At our first meeting after the recess the manager of works reported that he did not consider the estimate sufficient. The architect also reported that, having regard to the continued rise in the cost of materials since his estimate was made in June last, he considered that such estimate should be increased to 4,000*l.* We thereupon inquired whether the manager would carry out the work at this increased figure, and as he was not prepared to do so, an advertisement was issued inviting tenders for the erection of the court. The following tenders were received and referred to us by the Council on the 15th instant :—Messrs. Marchant & Hirst, 3,869*l.* ; Messrs. Spencer, Santo, & Co., Limited, 4,261*l.* ; General Builders, Limited, 4,400*l.* ; Mr. H. H. Sherwin, 4,698*l.* ; Messrs. J. Shillitoe & Son, 5,299*l.* ; Mr. H. C. Clifton, 5,527*l.* The tender of Messrs. Marchant & Hirst is within the amount of the architect's revised estimate, and we recommend that the tender of Messrs. Marchant & Hirst, amounting to 3,869*l.*, for the erection of the Paddington coroner's court, be accepted ; that the solicitor be instructed to prepare the contract ; and that the seal of the Council be affixed to the contract when ready."

The Council adjourned at 7.30 o'clock.

THE INSTITUTION OF CIVIL ENGINEERS.

AT the ordinary meeting of this Institution on the 29th ult., Mr. James Mansergh, Vice-President, in the chair, the paper read was on "The Effect of Subsidence due to Coal-workings upon Bridges and other Structures," by Mr. S. R. Kay.

The subject of the paper had frequent application in the busy industrial districts of the coal-fields, where lofty buildings, heavy bridges and costly tunnels were often found in the immediate neighbourhood of colliery operations. It was necessary, therefore, in designing works in such districts to know, first, the principles of subsidence following the working of coal, to determine the position and character of the works ; secondly, an approximation to the area necessary to be left unworked for the protection of the same ; and thirdly, how the design may be suited to the supposition that the coal may afterwards be worked without any solid pillar being left for support.

Subsidence always followed coal-working where no pillars were left, and was generally proportionate to the thickness of material excavated. The depth regulated roughly the duration of the movement. Subsidence might be modified by tight packing of the goaf (where no coal was left for support) under the area to be protected.

Faults were responsible for much of the damage resulting from coal working. Their lines were those of greatest weakness in the strata overlying the coal, and subsidence would sometimes travel many yards out of its ordinary course along such lines. They were, therefore, to be avoided in the erection of permanent works, even if pillars of coal were purchased for support, as it was impossible to guarantee against a possible "drag," or "pull over," of the strata, unless an abnormally large area of support was secured, and this on economic grounds was inadvisable. In the absence of faults, natural breaks and joints in the strata, within the limits of the dynamic effect of the subsidence, formed the lines of weakness. Fractures seldom found their way to the surface from depths greater than 100 yards, unless the thickness of the seam was considerable, or a thick bed of rock intervened. Workings had been safely carried under canals and rivers at that depth. Subsidence was slower in deep than in shallow mines, and surface breaks were rare save along lines of fault. The effect was felt in the case of buildings more in the nature of a "pull over" than of an actual break. The strain moved with the working face and was not brought into play unless the working ceased for a sufficient time to cause it to become operative.

A series of levels, extending over five years, had been taken by the author over two separate colliery royalties under which the coal was being worked, at depths of 120 yards and 330 yards respectively. They proved, in the former case, that subsidence closely followed the extraction of the coal, and continued for three and a half years, amounting to 70 per cent. of the thickness excavated ; in the latter case it followed somewhat later, continued for four years, and amounted to 64 per cent. of the thickness excavated. The strata in each case were fairly level and of the average coal measure character, the movement was uniform, without breaking the surface.

Subsidence around pillars left for support was shown to be most irregular in its action, and no theoretical formulas could be enunciated to apply to all cases, giving the size and position of the support necessary. All rules for that object were therefore of an empirical character, and subject to modification by local considerations. If absolute immunity was to be secured, an ample pillar should be left.

If the site of works be over a fairly large area of goaf, even settlement might be expected, and when complete the surface would be left nearly as before, though at a lower level. Works should be placed away from goaf edges if possible. A period of two years or three years at least, after the coal was extracted, should elapse before commencing works, and more if possible in the case of deep mines. In building ordinary road or railway bridges, or viaducts, the form of the arch should be avoided and steel superstructure employed, having the requisite elasticity to adapt itself to any slight movement subsequent to erection. Waterworks and reservoirs, where certain heights above sea level were to be maintained, should not be constructed in mining districts unless the suitability of the site outweighed the cost of protection. Where coal was worked underneath canals the banks must be puddled and raised to the extent of about two-thirds of the thickness of excavation. Locks should, as a rule, be protected by pillars.

In horizontal mines the theoretical line of break or subsidence over the edge of a pillar was vertical or nearly so. In practice this was found to vary to one side or the other, owing to the natural lines of weakness in the strata leading the breaks out of the theoretical course. This must be allowed for in setting out the pillar which in horizontal mines should surround the structure equally on all sides. For the purpose of ascertaining the size of pillar, under normal conditions, for any depth and thickness of seam, the author gave the following empirical formula, based upon many examples of modern practice :—

$$r = \frac{\sqrt{3d} \times \sqrt[3]{t}}{0{\cdot}8}$$

where d is the depth in yards t the thickness excavated in feet, and r the radius of support in yards. In the case of mines inclined to, say, 30 degrees, though the size of the pillar given by the formula was sufficient, its position would not be vertically below the structure as in flat mines, but must be towards its higher side. The author had found that the line of break in such cases was neither vertical nor at right angles to the dip, but midway between the two. Thus, if the angle of dip be θ, the angle the line

of break usually made with the horizon was $90 - \frac{1}{2}\theta$, and the lateral displacement in the direction of full rise of the seam, d being the depth, was represented by—

$$d \text{ Tan } \tfrac{1}{2}\theta \text{ Ccs } \theta.$$

Pillars of large area at depths of over 300 yards might with safety be partially worked or ribbed across by means of narrow banks or workings 20 yards wide, leaving solid pillars 20 or 30 yards wide between. This was found not to impair the strength of the support, the strata appeared to arch themselves over the worked portions, and there was practicatly no subsidence. This effected a considerable saving in the purchase of large pillars. In the case of bridges, where a succession of seams would probably be worked, it was necessary to consider whether the subsidence of level and possible rebuilding of the bridge, or the purchase of the mines for support in an increasing descending ratio, was the more economical or preferable.

Bridges with strong well-bonded abutments and wings, and steel superstructure, were frequently worked under, and sustained little or no damage, especially in the case of deep mines. Where, therefore, they must be built over an area to be subsequently mined, the intention being not to purchase support, they should be built in the manner described, and the girders should have a good bearing upon the beds. The subsidence to be expected, amounting to about two-thirds of the thickness excavated, should, if necessary, be provided for in the first height of the bridge ; otherwise provision should be made for the eventual raising of the superstructure to its former level if required. Lofty viaducts should be protected by pillars ; and lower structures should be built as indicated ; the piers should be solid and should not be pierced by an arch. In all cases, if possible, the goaf under the above should at the time of working be tightly packed.

ARCHITECTURAL ASSOCIATION DISCUSSION SECTION.

THE fourth meeting this Session was held at 56, Great Marlborough-street, on the 2nd inst., Mr. H. J. Leaning, Chairman of the Section, occupying the chair. The subject of the evening was "Constantinople," which was dealt with by Mr. A. E. Henderson. Mr. Henderson, who is the Owen-Jones Travelling Student, has been spending the greater part of a year in the Turkish capital and its surroundings, sketching and measuring ancient work. He has been fortunate in obtaining permission to draw in mosques which had before been inaccessible to Christians. His visit home is only for a short time, as he intends to return and continue his studies in Byzantine architecture. His address was not a formal paper, but rather a chatty discourse bristling with personal anecdotes of a travelling student's life and work in the Ottoman city, illustrated with many beautiful water-colour sketches, measured drawings and photographs. Mr. Henderson commenced by describing his first view of Constantinople on a clear moonlight night from the deck of the steamer anchored in the Sea of Marmora, the unique beauty of the seven-hilled city, and went on to tell his experiences with the language, his difficulties in getting permission to draw in Santa Sophia, and his ultimate success through the efforts of the British Embassy, his excursions in the three-halfpenny steamers on the Golden Horn, and his police escort when he went a-sketching. He then described the general topography of the city, and the more important buildings, ancient and modern. He mentioned the kindness of the director of the Museum who allowed him to measure and sketch objects of interest free of charge. Some of his sketches and photographs illustrated these, which included the wonderful sarcophagi recently found in Syria and supposed to have been made by the orders of Alexander the Great for one of his generals. Having read a quaint and curious, though very rambling, account of a Frenchman who succeeded, by much crafty intrigue and payment of sequins, in getting into Santa Sophia in the seventeenth century, and making a "draft" from "A Late Voyage to Constantinople by Monsieur William Joseph Grilot, made English by J. Philips" (London, 1683), Mr. Henderson proceeded to sketch briefly the history of Santa Sophia and to describe his own drawings of the great mosque, which included coloured drawings of the interior, details of doors, faïence, &c. He then described a little Byzantine church of the twelfth century, St. Mary Pammakaristo, of the decoration which he had made some careful drawings. During his residence in Constantinople, Mr. Henderson made the acquaintance of Professor Alex. Van Millingen, of the American College there, who is preparing a work on the ancient wall surrounding the city, and made for him the drawings and maps which will illustrate the book ; proof sheets of some of these he exhibited, and went on to describe the Palace of Porphyrogenitus, which stands at a junction of two parts of the wall to the north of the city —the only beautiful piece of domestic architecture, he said, he had seen in Turkey.

A discussion followed, in which several members took part, and which was summed up by the Chairman, who said Mr. Henderson was to be congratulated on obtaining particulars of buildings hitherto only slightly known to the western world. He called attention to a work on Byzantine architecture by Messrs. Schultz and Barnsley, which is just now completed, and alluded to a church about three miles from Reigate designed by Mr. Barnsley, which was a notable example of the adaptation of the Byzantine spirit to modern design.

Mr. R. Phené Spiers, who attended the meeting as special Visitor, gave some interesting reminiscences of his visit to Constantinople thirty-two years ago and described the form of centring which was probably employed to build the immense transverse arches of Santa Sophia. According to Procopius, who watched its erection, a wall of stone was built up and the arch constructed upon it. When the arch was partly built the wall below showed signs of bulging and the builders were alarmed for its safety. With one of the happy inspirations which the flattering historian attributes to him, the Emperor ordered the arch to be completed at once and when the wall was removed, the arch took its proper position and was perfectly stable. Mr. Spiers said there was no doubt Santa Sophia had the finest interior in the world. He had seen St. Peter's at Rome, Karnak, and Beauvais, but for perfect proportion and beautiful decoration Santa Sophia was unsurpassed.

Votes of thanks to Mr. Henderson and Mr. Spiers were carried with enthusiasm, and Mr. Henderson having replied the meeting terminated. The next meeting will be held on the 16th inst., when Mr. S. W. Cranfield will read a paper on "Buildings for Secondary and Technical Education."

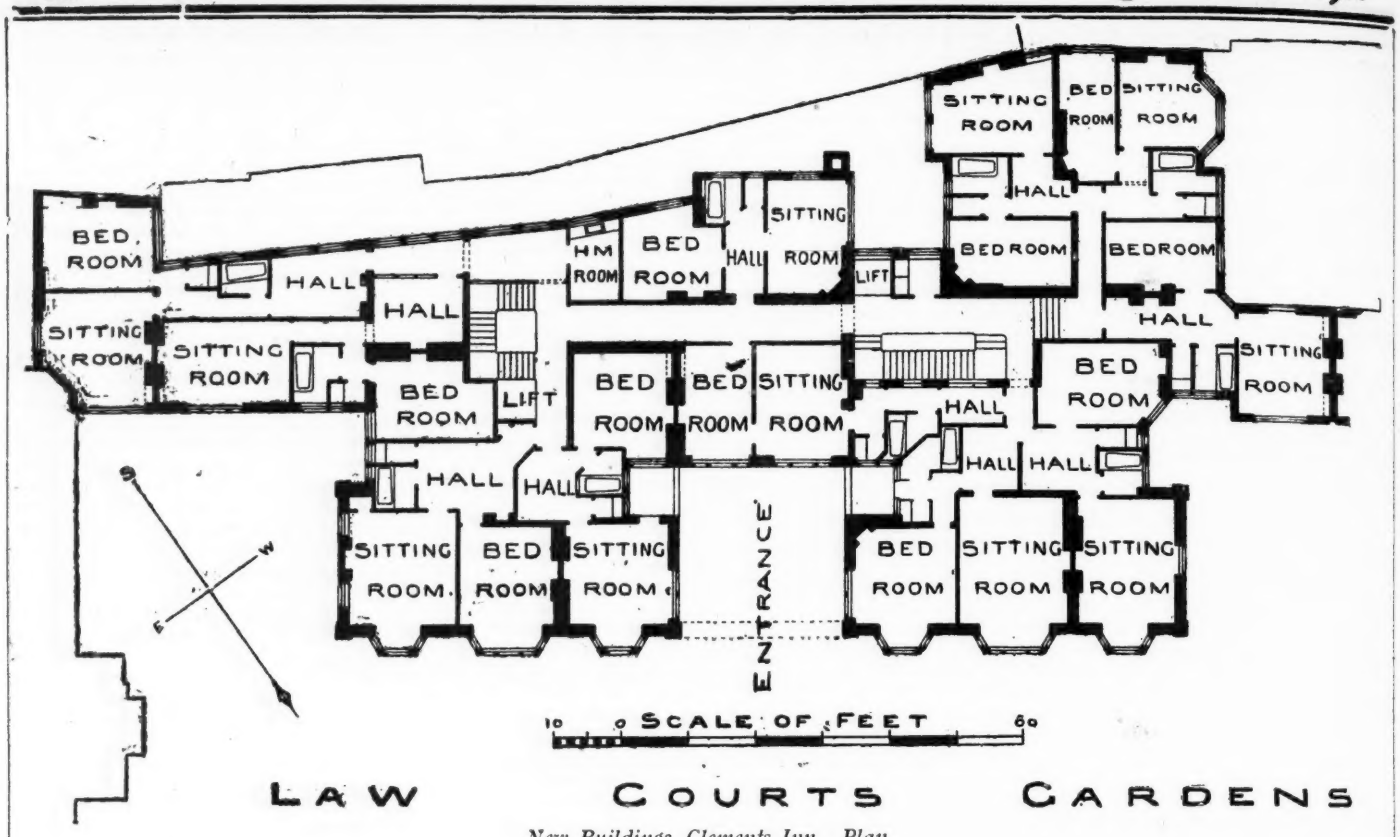
DINNER TO MR. C. W. WHITE.

To those of the public who have had occasion to visit the Building Act Office in Spring-gardens, Mr. C. W. White's personality is familiar, and it will interest them to hear that a few of his friends entertained him last week at "Kettner's," in connexion with his approaching retirement from the position of Chief Clerk of the Architect's Department under the London County Council. His official life dates back thirty-eight years, to the time when the Commissioners in Greek-street held sway, before the era of the Metropolitan Board of Works, who in their turn were swept away to give place to the present Council. Mr. White's polite, urbane manner to the public, his official loyalty, his correct judgment, and his unique recollection of all appertaining to his department, have been invaluable to those whom he has served so long. Sir John Hutton, ex-chairman of the Council and of the Building Act Committee, presided at the dinner, and by his genial and interesting remarks afterwards gave utterance to the thoughts of many friends who were not present. The Chairman was supported by Dr. Longstaff and Mr. Payne, both ex-chairmen of the Building Act Committee, Mr. William Davies, J.P., the present chairman of that Committee, Mr. Blashill, the superintending architect, Mr. Hebb, Mr. Lancaster, and Mr. Millwood, members of his staff, Mr. Rowland Plumbe, as representing the District Surveyors, and Mr. Kersey and Mr. Collard, as showing the interest of the architectural profession generally. All spoke of their pleasant recollections of Mr. White and their regret at shortly having to part with him. In acknowledging these kindly sentiments and the gift which was presented to him in remembrance of the occasion, Mr. White expressed his appreciation of his friends' kindness, and his pleasure at being invited to meet them at the close of his official life.

ENGINEERING SOCIETIES.

CIVIL AND MECHANICAL ENGINEERS' SOCIETY.—The opening meeting of the Session of this Society was held at the Hotel Victoria on Thursday, the 1st inst., when Mr. Baines Dadley, the President, delivered an opening address. He proceeded to refer to the various railway extensions in progress in London, especially the underground tubular system originally introduced by the late Mr. Greathead, which he described as a great step forward in the science of practical engineering. From the citizen's point of view he, however, considered it was not an altogether unmixed blessing, for travelling in tunnels was distasteful to most people, and should a serious accident occur in one of these the extrication of the injured passengers might be extremely difficult. He was of opinion that if a fair trial was given to electric railways on the overhead system it would be welcomed by the public. Dealing with the bridges over the Thames, he suggested that when a railway company was granted permission to construct a bridge over the river, it should be on condition that a road bridge was combined with it, such a regulation, he understood, already existed in some of our colonies. The steamboat traffic on the river had greatly fallen off because the land services had improved to an extent which had not been imitated by the river service ; but with covered landing-stages, improved boats, running at greater speed, at more frequent intervals, there was no reason why an all year-round service should not be resuscitated. The river was also badly lighted, and the public lost after dusk the advantage of this splendid highway through the centre of the metropolis. Were the bridges and banks lighted with diffusive electric arc lamps, traffic could be carried on by night as well as by day. Referring to the labour question, he stated that, during last year only, the working men of this country, through labour disputes, lost 10,300,000 working days. He thought the root cause of the trouble was the destitute condition of the workmen in their old age, the example of which spurred the younger men to demand higher wages while they were able to work, and as this could only be obtained by combination against the employers, strikes were the result. He suggested that the Government should take over the funds and liabilities of the trade societies, and inaugurate a "pro ratâ" system of State pensions for which compulsory contributions of a per centage of the wages should be deducted by the employer, and paid over to the State Department, and that a judicial commission should be appointed to act as arbitrator in all labour disputes, its decision being final and binding on both parties for a term of years.

SOCIETY OF ENGINEERS.—At a meeting of the Society of Engineers, held at the Royal United Service Institution, Whitehall, on Monday evening, Mr. W. Worby Beaumont, President, in the chair, a paper was read by Mr. George Thudichum, F.C.S., entitled, "The Bacterial Treatment of Sewage." The author observed in his opening remarks that he did not enter into any theoretical considerations, taking it as a fact that the majority of those concerned accepted the general doctrine of bacterial treatment. The paper dealt with practical applications only. After describing the special uses of different processes under varying local conditions of fall, nature of soil and sewage, the author gave in detail the method adopted at Worcester Park, where the Cheam and Cuddington sewage is received, to convert a process of precipitation and irrigation into one of bacteria bed treatment and irrigation when desired, showing how the necessary beds were constructed by excavation, and filled with burnt ballast produced on the farm, at a total cost of about 325*l.*, the quantity of sewage to be dealt with amounting to 80,000 gallons daily in dry weather. The conversion of the Sutton sewage works was also alluded to, the cost there having been something less than 2,000*l.* for a daily flow of half a million gallons of sewage, whilst the saving in working expenses was 500*l.* per annum. The author then discussed the general questions of the interception of road detritus ; the catching by screens or otherwise of pieces of rag and any large floating matter ; and the dealing with night sewage by the provision of a special bed for its reception, with syphons for the automatic emptying of the bed in case of storms. The author next dealt with the problem of sewage treatment as applied to hospitals, schools, country houses, and other small communities.



New Buildings, Clements Inn. Plan.

Alternative methods were described, and some particulars were given concerning a recent installation at a large public school. In conclusion, the author pointed out that all the statements made on the occasion of his paper read in 1896 before the Society of Engineers still remained good; that knowledge had greatly increased during the past two years, but without altering, only extending, the ideas entertained at the date of his paper, as a result principally of the Barking experiments; and that the correctness of the particular method of working by alternate filling and emptying had been confirmed by all later experiments.

Illustrations.

THE RE-BUILDING OF CLEMENTS INN, W.C.

THE central block of Clements Inn, as shown in the view here published, is the last of the blocks re-erected in the Inn.

This new block has been erected to the extreme height allowed by the London Building Act, as the demand for offices and chambers is so great in the neighbourhood; fortunately the site is so open that this great height of building was possible without over-shadowing other buildings. The elevation has been designed in a bold outline with a large projecting cornice proportionate to the great height of the building.

The entresol, ground, mezzanine, and first floors have been arranged as offices in suites. The floors above these are planned for residential chambers. Lifts are provided in a central position between the two entrances on the ground floor, and run to the top.

The front of the main wings is faced with Portland stone to the cornice level above the mezzanine windows; above this the walling is of red brick, and the dressings and bays in Portland stone. The roofs are constructed of steel and concrete, and covered with an asphalte flat; the slopes of the roof are covered with green slates.

The builder is Mr. Edward C. Bull, of Southampton, and the architect is Mr. Basil Slade.

ILLUSTRATIONS OF VENICE.

WE are publishing in this issue, on another page, a long paper on Venice read at the Bristol Architectural Society by Mr. Mowbray A. Green, architect, of Bath, who is a member of that Society. Though Mr. Green does not enter into any new considerations in regard to Venetian architecture, his paper is a good summary of the history of the city and of the objects of architectural interest in it, and may in that sense have a value to some of our readers, especially to any who may be about to visit Venice for the first time.

By way of adding to the interest of the paper we give, as an accompaniment to it, some illustrations of buildings in Venice which are mentioned in the paper, and which (with the exception of the Grimani Palace) are not among those which are most familiar in illustrations. Among them is a rather curious bird's-eye view of Venice from an old engraving.

SKETCHES FROM SIENA AND VENICE.

THE first of these sketches, showing a portion of the principal façade of the Palazzo Publico, Siena, is typical of Italian Gothic of the end of the thirteenth century; and though poor Gothic to northern eyes, is, nevertheless, imbued with the artistic feeling never wanting even in works designed in a manner the true principles of which were imperfectly understood. The jointing of the arches, and their greater depth at the apex or crown than at the springing, is peculiar and hardly reasonable, and the segmental arch immediately below the pointed form is a good illustration of how tenaciously the classic forms were adhered to; the crockets to the label afford further evidence of this, and are in themselves a beautiful adaptation of the acanthus to a Gothic feature. In the tympanum of the doorway is carved the arms of Siena—the she-wolf and twins, in white marble, on a blue ground with stars, and on the shield a lion rampant on a red field. The lower stage of the building is of a dark stone, and the upper of red brick relieved by white marble strings and mouldings.

The sketch from the Calle S. Moisè is one of those happy bits so frequently met with in Venice, sometimes when least expected. The simple window treatment, with the wrought-iron grilles, has a pleasing effect. The wall is plastered on the outside, and the natural wear and tear and Nature's colouring, aided by art, combine to give this wall much charm. The original sketches are in colour.

T. R. KITSELL.

COMPETITIONS.

TAVISTOCK-ROAD COMPETITION, PLYMOUTH.—A competitor writes to us that the drawings for this competition were sent in on September 24, and that on writing to enquire about it he has received a letter from the Town Clerk saying that the assessor has not yet been appointed. From what we hear, we believe that the terms of the competition are considered so unsatisfactory that it may be difficult to find any assessor who is a member of the Institute who would be willing to act.

ARCHITECTURAL SOCIETIES.

NORTHERN ARCHITECTURAL ASSOCIATION.—On the 30th ult. the members of the Northern Architectural Association held a meeting in their room at the Art Gallery, Newcastle, Mr. F.W. Rich, President, presiding. It was decided to support a petition prepared by the Royal Institute of Architects against the destruction of ancient buildings in Florence. The Rev. Canon Savage then gave a lecture on "Durham Cathedral," with lantern illustrations. The lecturer gave an account of the architecture of the cathedral throughout its various stages, and was accorded a vote of thanks on the motion of the Chairman, seconded by Mr. Hicks.

EDINBURGH ARCHITECTURAL SOCIETY.—On the 30th ult. Mr. R. S. Lorimer read a paper on Scotch gardens before this Society. Mr. W. Nicholson Cumming, the President, occupied the chair. Mr. Lorimer began with a eulogy of the garden as a place of privacy remote from the worries of business, where the imagination and the kindly social virtues grow as of their own accord. Scottish garden history was summed up in an importation of French ideas in the days of the ill-starred Mary, and in this connexion Mr. Lorimer gave some pleasing reminiscences of those romantic times. The great principles of laying out grounds were then enumerated and discussed—the wide demesne beyond the garden unbroken by wall or hedge, the wide, straight avenue, the vistas stretching through the garden to the park beyond, and the disposition of such architectural features as gates, summer-houses, fountains, and statuary. Mr. Lorimer then, with the aid of limelight views, led his audience through a pleasant world of cut yew hedges and close-cropped grass alleys, past rose-gardens and sun-dials, along stately terraces, explaining the while how these pleasing results were obtained from his intimate knowledge of all connected with gardening. The slides illustrated such famous pleasure grounds as Balcaskie, Edzell, Wemyss, and Fordell. Some ingenious French devices of lath trellis-work were also shown. A very hearty vote of thanks was accorded.

GLASGOW ARCHITECTURAL CRAFTSMAN'S SOCIETY.—A meeting of this Society was held on Friday last week. The paper for the evening was by Mr. D. Bennet Dobson, and his subject was—"Calculation Simplified," applied to building structures generally. The lecturer treated his subject under the following heads—reactions,

bending moments, moments of resistance, mathematics in brief, wood beams, cast-iron beams, rolled-iron beams, steel beams, wood struts, and cast-iron columns, and went over the formulæ in a simple and comprehensive manner. He illustrated his remarks by going over examples of each on the black board. He gave new formulæ for rolled-iron and steel beams and wood struts, which, when worked out, compared favourably with the older and more complicated formulæ. A new one was also given for cast-iron columns, which was very simple and easy to understand—a thing which could not be said of the usual formulæ given by Rivington and other text books. It is one which should prove valuable to all members of the Society.

GLASGOW SCHOOL OF ART.—The third lecture on "The Architecture of the Renaissance in France" was delivered on Monday, the subject being the Central Renaissance (Valois Period)—1547-1589. Before the end of the reign of François I. the scene of activity had been changed from the Loire to the Seine; from Chambord and Chenonceaux to Fontainebleau and Paris; and the first characteristic is a decided retrogression of taste on the part of the King's architects in this district. The Palace of Fontainebleau was described, and its gradual extension traced from early times; and salient features such as the Court of the White Horse, the horse-shoe staircase, the Porte Dorée, the Porte des Aumoniers, the Chapel St. Saturnin, the Hall of Henri II., &c., illustrated. The retrogression which the earlier parts of Fontainebleau evince were not made good till the time when Lescot and Goujon united their labours at the Louvre and the Fontaine des Innocents about 1547, and this marks the commencement of the culminating period. The old Hotel de Ville, Paris, was instanced as an example of transition from Early to Middle Renaissance; and it is in the works of the architects Lescot, Philibert De l'Orme, and Bullant, and of the sculptor Goujon, that the Central period can be studied. As in Italy, the culmination consisted partly in fusion of the several local schools of artists, like those of Touraine, Rouen, Burgundy, and Toulouse, but the word which it writes most plainly is Rome. De l'Orme and Bullant had been there, and had studied closely the monuments of antiquity; so that both French and Italian drew inspiration from a common source and not one from the other. Representative works, such as the Louvre of Lescot and Chambiges the younger, De l'Orme's design for the Tuileries and for the Château d'Anet, and, lastly, Bullant's part of the work at Ecouen and Chantilly, were illustrated and compared in their composition, and their decorative and sculptural details.

METROPOLITAN ASYLUMS BOARD.

SIR EDWIN GALSWORTHY presided on Saturday last at the fortnightly meeting of the managers of the Metropolitan Ayslums District, at the County Hall, Spring Gardens.

The Brook Hospital Question.—No report from the General Purposes Committee was on the paper as to the Local Government Board's decision on the Brook Hospital inquiry; but a further letter was read from the Local Government Board, stating that their attention had been drawn to the fact that there had been the same irregularities by Mr. Aldwinckle, the architect, in connexion with some works at the South Western Hospital, as at the Brook Hospital. They therefore directed that a further sum of 62*l.* should be deducted from Mr. Aldwinckle's commission account.

A long letter was read from Mr. Aldwinckle, replying to the Local Government Board's communication on the recent inquiry. He regarded the report of Mr. Knollys as a fair one, although he did not agree with all the conclusions it contained. Mr. Knollys admitted that most of the work ordered without the direct sanction of the committee was "necessary, or at least very desirable." He only named two items—655*l.* for teak flooring and 663*l.* for ward stoves—which he considered to have been ordered without justification On an expenditure of over a quarter of a million this was a very small matter. There was no suggestion that there had been any waste of public money, or that the managers had not received full value for their expenditure. He admitted that he had not taken the proper course, but the managers' interests had not suffered. He indignantly repudiated any suggestion that he had ordered extra works to increase his fees. The fact that at the Fountain Hospital he voluntarily surrendered 2,200*l.* of the fees to which he was legitimately entitled showed that this was not a thing he was likely to do. As to the Local Government Board letter, it was not so fair as the report of Mr. Knollys. No allowance was made for the great difficulties of the site, and the short time allowed for the preparation of plans. The words "grave irregularities" should not have been used of a man of his professional standing, who had done so much public work, simply on the ground that some items had been ordered without authority, while there was no suggestion that the public money had been wasted. The cost of the hospital had been increased at least 53,000*l.* by the difficulties of the site. Deducting that amount, the cost was not above that of other hospitals of up-to-date construction. Long after the criticisms of the Local Government Board were forgotten, the Brook Hospital would stand as a monument of good work done under exceptional difficulties. It was resolved to forward Mr. Aldwinckle's reply to the Local Government Board.

Appointments.—Mr. Rowland Plumbe, of 13, Fitzroy-square, W.C., was appointed architect of the proposed convalescent children's homes at Rustington, near Littlehampton; Messrs. Newman & Newman, of 31, Tooley-street, S.E., were appointed to prepare plans and specifications and to superintend the alterations of the laundry buildings at Leavesden Asylum.

No Tenders—It was resolved, subject to the consent of the Local Government Board, to accept the offer of Messrs. W. Johnson & Co., Limited, of Wandsworth Common, S.W., to carry out additional alterations at the South-Western Hospital for 1,950*l.* 4s. 10d., in accordance with the specification prepared by Mr. T. W. Aldwinckle, architect.

A Delayed Contract.—The Works Committee reported that they had taken steps to defend an action which had been brought against the Managers by Messrs. Leslie & Co., Limited, claiming damages for "loss occasioned by reason of the Managers having wrongfully impeded and delayed the execution of the contract, dated July 25, 1895, for the erection of the Park Hospital and other premises, and for bonus or loss of bonus payable to plaintiffs, pursuant to a letter from the Managers dated October 21, 1896."

Proposed Permanent Architect.—The following motion was down on the paper in the name of Mr. Edward White, L.C.C.:—"That it be referred to the Works Committee to consider and report whether it is desirable for the Managers to appoint an architect or surveyor, or an architect and surveyor to the Board, and if so on what terms and conditions, and for the performance of what definite duties." The Chairman ruled that as the matter had been discussed on June 18, and deferred for six months, the motion was not now in order. Mr. White: I presume it will be in order at next meeting. The Chairman: No, at the meeting after. The Managers then adjourned.

APPLICATIONS UNDER THE 1894 LONDON BUILDING ACT.

AT the meeting of the London County Council on Tuesday, the Building Act Committee brought up the following list of applications under the London Building Act, 1894. Those applications to which consent has been given are granted on certain conditions.*

Lines of Frontage.

St. Pancras, South.—Iron and glass roofing at, and a brick and iron gangway to connect certain buildings on the north and south sides of Conway Mews, Fitzroy-square, St. Pancras (Mr. J. Johnson for Mr. P. W. S. Ell).—Consent.

St. Pancras, West.—An iron and glass shelter at the entrance to the Bedford Music-hall, High-street, Camden Town (Mr. B. Crewe for Messrs. Lucas & Johnson).—Consent.

Width of Way and Deviation from Certified Plans

St. Pancras, South.—Buildings, partly two stories and partly one story in height, with stables on the ground floor, on the west side of Wicklow-street and the south side of St. Chad's-place, Gray's-Inn-road, and certain deviations from the plans certified by the District Surveyor (Messrs. W. S. Cross & Kekwick for Messrs. Willing & Co., Limited).—Consent.

* Names of applicants are given in brackets. Buildings are new erections unless otherwise stated.

Formation of Street.

Fulham.—That an order be issued to Mr. F. Matcham sanctioning the formation or laying out for foot traffic only of a new street, to lead out of the east side of Harwood-road into Cedar-road, Walham Green (for Sir J. H. Johnson). That the name Fashoda-place be approved for the new street. —Consent.

Height of Buildings.

Fulham.—A theatre on the eastern side of Harwood-road, Fulham, to abut upon a proposed new street, 20 ft. wide, between Harwood-road and Cedar-road, to exceed in height the width of such new street (Mr. F. Matcham for Sir J. H. Johnson). —Consent.

BOOKS RECEIVED.

MONOGRAPHS ON ARTISTS. I. RAPHAEL. By H. Knackfuss. Translated by Campbell Dodgson. (H. Grevel & Co.)

ARCHÆOLOGICAL SURVEY OF EGYPT: SIXTH MEMOIR. By F. Ll. GRIFFITH. (Kegan Paul, Trench, Trübner & Co.)

Correspondence.

***To the Editor of* THE BUILDER.**

VENTILATION OF SEWERS.

SIR,—When ventilation is neglected in dwelling-houses, in sleeping apartments—where it is so necessary—in places of worship, and lecture halls, there need be no surprise that it is neglected in *main sewers*. On the 3rd inst. two men were overpowered and suffocated by the foul gases in a main sewer in Manchester.

The disaster might have been much more serious, as several brave fellow-workmen very nearly lost their lives in trying to rescue their mates. It is evident that there is danger to life in entering unventilated main sewers in certain conditions of the atmosphere. This danger ought not to be; it is a matter of some importance, which the Manchester Corporation will have to deal with.

A few years ago at Llandudno the only ventilation to the sewers was by means of grids at the street level, mostly in the back streets. One of those grids was fixed at the back of the Hydropathic, Neville-crescent. A few days after that I was there on business, and found the foul air escaping freely from the grid—that point being at a higher level than at some other parts of the town. No time was lost in calling upon the surveyor to complain of the dangerous nuisance. He said, "Well, what can be done?" I answered, if he would come with me I would show him what could be done, and what must be done at once. The sewer was ventilated into the steam boiler chimney. This plan has been carried out in other parts of the town, to the great advantage of the healthiness of Llandudno. There is no difficulty whatever in ventilating main sewers, if carried out on a correct basis. In cases where it is necessary to provide a furnace at the bottom of the ventilating shaft, the air from the sewer may be either burnt or disinfected.

Manchester. J. CONSTANTINE, Sen.

ARDROSSAN FEVER HOSPITAL COMPETITION.

SIR,—Your correspondent does well to complain, in your issue of the 3rd inst., about the treatment received by the competitors for Ardrossan and Saltcoats Fever Hospital.

It may not be known that a local architect is the chairman of the Hospital Committee, and in all fairness to his professional brethren he should have seen this matter decided.

Have the plans been sent in simply to give any interested party information, or is the Committee repeating the tactics adopted in the competition for Saltcoats Town Hall, when the competitive plans were set aside? ANOTHER COMPETITOR.

SMOKE ABATEMENT.

SIR,—Pending the advent of efficient legislation, much can be done by the simple expedient of placing a layer of coke on the top of each coal fire, in the proportion of a quarter coke, three-quarters coal.

The result as I daily prove is: (1) increased heat; (2) diminished cost; (3) diminished smoke.

ONE WHO HAS TRIED IT.

PROPOSED BLAKE STATUE, BRIDGWATER.—At a meeting of the general committee a report was read from the executive committee appointed to carry out the details connected with the erection of the proposed statue of Admiral Blake on the Cornhill upon the progress already made with the scheme. The committee therefore recommended the work being proceeded with, and a sculptor selected to design and execute the statue. The report was adopted, and the meeting selected Mr. F. W. Pomeroy as the sculptor to execute the work.

The Student's Column.

SOUND, LIGHT, AND HEAT.—XXIII.

HEAT: TEMPERATURE.

LOW temperatures are determined by means of thermometers of various kinds; whilst high temperatures are commonly ascertained by pyrometers, vapour density determinations, seger cones, and the like.

In the construction of ordinary thermometers advantage is taken of the expansion of liquids on being heated. The liquid is confined in a tube from which the air has been abstracted, and very frequently there is a reservoir at one end of the tube. The essential part of the process is the creation of the vacuum (as far as that can be done) without which the liquid cannot be readily introduced into the tube. That part of the process having been satisfactorily accomplished, the end of the tube is sealed up, care being taken, first, not to completely fill the tube with the liquid, but to leave a space above it, which space must also be a vacuum. This is usually done by heating the bulb of the tube in, say, the flame of a spirit lamp which causes the air within to expand; as the air escapes the liquid is let in. The latter is then heated to boiling point, or until it fills the tube, and then the tube is sealed. On cooling, the liquid contracts, and the space left above it in the tube is a fairly good vacuum.

The next thing is to graduate the tube, or to make an index beside it. The bulb of the thermometer is then placed in a vessel containing pounded ice and allowed to remain there for some minutes. The point to which the liquid descends within is then marked off, and this is called zero, or freezing point, and is a fixed position. Another fixed position is the boiling point, which is marked off in a similar way, and the distance between the two can then be readily sub-divided in any convenient manner.

These subdivisions vary according to the method of calculation adopted. In this country we have the most absurd method hitherto devised, viz., the Fahrenheit. According to this, the freezing point is denominated 32 deg., and the boiling point 212 deg.; in the Centigrade (devised by Celsius) the interval between freezing and boiling points is divided into 100, the former being called 0 deg.; in Réaumur's thermometer the freezing point is called 0 deg. and the boiling point 80 deg. The only defence the Fahrenheit method can have is that it divides the interval into more degrees than the others; still, by Centigrade we habitually divide each degree by one-half, so that in reality we get 200 divisions between the freezing and boiling points, instead of 180 deg. as by Fahrenheit. It is very inconvenient in registering very low temperatures to use the last-mentioned scale. For instance, 40 deg. below zero have to be denominated as — 8 deg. Fahr., and so on. It is much better to take the Centigrade scale and commence with the minus sign for every degree below zero. In fact, the Centigrade scale is becoming almost universal amongst scientists in practical work. When putting their results before the public they convert the Centigrade into Fahrenheit by a simple calculation, as the public is more accustomed to the latter. A statement, emanating from an official source, in front of us, says that the Réaumur scale "formerly" in use in Germany and Russia is now practically defunct. That is very incorrect, however, so far as Russia is concerned. No doubt the Réaumur is abandoned in national observatories, but any one who has recently travelled through Russia will know that that scale is still the usual one, though Centigrade is seen here and there.

In view of the fact that temperatures are recorded by all three methods in many communications made to engineers and architects in this country, it will be of interest to give the following methods of conversion from one scale to the other:—

To convert Fahrenheit readings to Centigrade, subtract 32 and multiply the remainder by $\frac{5}{9}$; *e.g.*, 68 deg. Fahr. when reduced becomes $(68 - 32)\ \frac{5}{9} = 20$ deg. C.

To convert Fahrenheit readings to Réaumur, subtract 32 and multiply the remainder by $\frac{4}{9}$; *e.g.*, 68 deg. Fahr. when reduced becomes $(68 - 32)\ \frac{4}{9} = 16$ deg. Réaumur.

To convert Centigrade to Fahrenheit, multiply by $\frac{9}{5}$ and add 32.

To convert Réaumur to Fahrenheit, multiply by $\frac{9}{4}$ and add 32.

To convert Centigrade to Réaumur, multiply by $\frac{4}{5}$.

To convert Réaumur to Centigrade multiply by $\frac{5}{4}$.

The two liquids commonly employed in making thermometers are mercury and alcohol. The great interval between the temperature at which mercury congeals to the solid state, viz., 71 deg. Fahr. below the freezing point of water, and that at which it boils, viz., 450 deg., above the boiling point of water, renders that metal especially suitable for the purpose mentioned. Moreover, mercury has a very low specific heat, or requires much less heat to raise it to a given temperature than most other liquids which could be employed for thermometric purposes, whilst it does not adhere to the glass of the thermometer tube. One of the advantages of alcohol is that it does not solidify, except at extreme degrees of cold (— 130.5 deg. C.); but the spirit rises and falls much more slowly than the mercury, because the specific heat of alcohol is fifteen times as great as that metal. In other words, fifteen seconds would be required by a spirit thermometer to measure a temperature which would be indicated in one second by a mercurial thermometer of the same weight. The student will remember that in a good thermometer there should be as complete a vacuum as possible above the liquid in the tube. But in a spirit thermometer that space is sure to be partly occupied by vapour of alcohol, which prevents a perfect record from being made. Other points in favour of the mercurial thermometer for ordinary temperatures is that the liquid expands very regularly over a long range in temperature, whereas with alcohol, and other liquids, the expansion is less regular in proportion as they are near the boiling point. It need hardly be pointed out that the thermometers in common use are not made to register over a great range in temperature. For ordinary purposes the graduations may run from about — 10 deg. Fahr. to 120 deg. Fahr., or thereabouts.

Self-registering thermometers are furnished with some contrivance for marking the highest or the lowest temperature to which they have been exposed during a given interval of time. They are commonly U-shaped. Maximum thermometers, for registering the highest temperature in a given period, are more difficult to construct. In the type devised by Negretti (described by Scott*), the registration is effected by the mercurial column, in the following manner:—The bore of the tube, close to the bulb, is reduced in section in such a way that while the expansion of the mercury is sufficient to force the thread of liquid past the obstruction, the cohesion of the metal is insufficient to draw it back again when the temperature falls. Accordingly the length of the thread of mercury above the contraction measures the highest temperature to which the instrument has been exposed since it was last set.

In Rutherford's minimum spirit thermometer the index is immersed in the liquid, and moves, with a little difficulty, in the tube. The instrument is fixed horizontally; if the temperature rises, the spirit will flow past the index without disturbing it, but if it falls, the index goes back also. The index must mark the greatest degree of cold which has occurred, inasmuch as it will remain unmoved when the spirit advances again owing to any rise in temperature. And there are several forms of self-recording thermometers.

A metallic thermometer is described by Ganot (p. 291), which is of considerable delicacy, and depends on the unequal expansion of metals. It consists of three strips of platinum, gold, and silver, which have been passed through a rolling mill so as to form a very thin metallic ribbon. This is then coiled in a spiral form, and, one end being fixed to a support, a light needle is fixed to the other, which is free to move round a graduated scale. Silver, one of the most expansible of metals, forms the inner face of the spiral, and platinum the outer. When the temperature rises, the silver expands more than the gold or platinum, the spiral unwinds itself, and the needle is moved over an index. The contrary effect is produced when the temperature sinks. This thermometer is graduated so as to approximately register centigrade degrees, by comparing its indications with those of a standard mercury thermometer.

* "Elementary Meteorology," 1883, p. 27.

Pyrometers are commonly employed where the temperature to be registered is too high for mercury thermometers. None of them give very exact indications and must be regarded only as approximate registers. The principles on which they are based take advantage of the expansion of gases and vapours, or the specific heat of solids. Many forms of the instrument register high temperatures by utilising pieces of pure metal the melting points of which have been previously determined. The following table of fusibility of metals may here be quoted:—

Fusibility of Metals.

Tin ...	...	melts at		...	442	deg.	Fahr.
Cadmium	...	„	„	...	442	„	„
Bismuth	...	„	„	...	507	„	„
Lead ...	...	„	„	...	617	„	„
Zinc ...	...	„	„	...	773	„	„
Antimony	...	„	„	...	1,150	„	„
Silver ...	...	„	„	...	1,800	„	„
Copper	...	„	„	...	1,990	„	„
Gold ...	...	„	„	...	2,000	„	„
Cast Iron	...	„	„	...	2,780	„	„
Steel ...	...	„	„	...	4,000	„	„
Wrought Iron		„	„	above	4,000	„	„

It will be noticed in this table that all temperatures above that relating to zinc are approximations. Platinum melts only in the arc-furnace or in an exceedingly good oxy-hydrogen blowpipe flame; that metal is consequently often employed in the best class of pyrometers. In recent years a platinum pyrometer devised by the Master of the Mint has come much to the front.

Dr. E. Buchner* found some difficulty in registering temperatures in the neighbourhood of 1,650 deg. Fahr., and down to about 1,200 deg. Fahr., and determining to use alloys and metals the melting points of which were known, in his investigations, designed an apparatus to do it automatically. His pyrometer measures the exact moment at which a given alloy or metal melts in the interior of a furnace. The apparatus consists of a vertical tube of refractory material which dips deeply into the muffle; inside this a small crucible is hung from a scale beam above; in the bottom of the crucible is a hole, so that when the alloy melts it runs through into a dish suspended underneath. This causes the scale beam to rise, and the motion of the beam, by electrical contact, rings a bell, and marks a dot on a sheet of paper moved by clockwork; this registers the exact time at which the melting-point is reached. This method only registers a series of more or less definite temperatures, of course.

A large proportion of the pyrometers in use are of very little value, because they are not properly employed. The other day we attended some experiments where, the rod pyrometer being used, a hole was roughly knocked through the wall, and the long end of the rod inserted into the aperture, and so into the blazing material, the temperature of which it was desired to ascertain. The instrument did not register the high temperature required to be demonstrated to us, so the management made no more ado but had a much larger hole broken into the wall on the other side of the building, and bringing the pyrometer round, pushed it through again into the burning mass. Once more the instrument was obstinate, probably on account of the treatment it had received. Apologies were made, and the pyrometer was blamed. As a matter of fact, however, it did its work as well as could be expected in the hands of inexperienced people; for the end of the rod was not thrust into the very interior of the burning mass, and there being a fairly high wind at the time it was too much exposed, for one end of the building was open. With less wind, and with the instrument properly placed, the results would have been different. The same observations apply to seger cones so commonly used is the clayworking industry; these are often blamed for not doing their work properly, but being made of materials of known composition and of known melting points they should not fail—they are prepared with the utmost care.

We have recently had brought to our notice Holdcroft's "thermoscope," in which rectangular strips made from various mixtures of silicates and oxides of known melting points are employed. This is of special interest in the manufacture of tiles, certain red bricks, majolica, fireclay goods, and biscuit ware.

In practice, the workman's eye often forms the pyrometer, but this is a method which must

* "Dingler's Polytechnisches Journal," vol. ccxxxiii., 1878, p. 429.

disappear with the advance of technical education. How many bricks, tiles, and china goods have been spoiled by this in being over-fired? How would the manufacturer of cast iron or steel compete successfully by such antique means of arriving at temperature? Surely, those who still adopt the rough and ready guesswork can have no real knowledge of metallurgy—as well might one follow in the footsteps of the alchemists of old. We are afraid to surmise how much valuable metal rendered brittle or altogether spoilt, terra-cotta by warping, bricks by semi-fusion, and porcelain by the glazing going wrong, has been wasted by relying too much on the unaided vision in their manufacture. Nevertheless, judging from the appearance of the fire, the "red heat" obtained in the domestic fire is valued at 1,000 deg. Fahr. And the following results have been obtained by Pouillet :—

	Deg. Cent.
Incipient red	525
Dull red	700
Cherry red	900
Dark orange	1,100
White	1,300
Dazzling white	1,500

These colours refer to metals when heated, and are, of course, very approximate. The personal equation, in regard to colours, is too strong for the figures to possess much scientific value.

OBITUARY.

MR. J. G. SANKEY.—Mr. Joseph Gibbons Sankey, M.A., architect, Manchester, died on the 1st inst. at his residence, Disley. Mr. Sankey was a native of Blackley. Two of his latest works were the Mercantile Bank in Mosley-street and York-street, and the warehouse of Messrs. Tootal, Broadhurst, & Co., Oxford-street, Manchester.

MR. GEORGE WILLIAM CROSBIE.—The death has just occurred of Mr. G. W. Crosbie. A native of Oxfordshire, Mr. Crosbie was for a great number of years the architectural agent of the late Lord Revelstoke, and to his designs and under his direct superintendence the many farmhouses and lodges upon that estate were carried out. He also was first and foremost in the extensive works connected with the extensions of Membland, his lordship's home. The church of St. Peter, built from the designs of the late Mr. Pier St. Aubyn, architect, of London, in 1882, at a cost of upwards of 30,000*l.*, was erected, under Mr. Crosbie, by the estate workmen. Mr. Crosbie's services were subsequently secured by Lord Derby. There, as his lordship's estate agent, he had the entire district from Liverpool to Runcorn under his immediate supervision. The funeral took place, on the 29th ult., at Knowsley, a village near Liverpool, where Mr. Crosbie lived.—*Western Daily Mercury.*

MR. T. CLARIDGE.—The death has occurred somewhat suddenly of Mr. Thomas Claridge, for eight years Surveyor to the Swinton Local Board, for twelve years Surveyor to the Stockport and District Highway Board, and up to his decease Surveyor to the Disley District Council. He was formerly engaged upon engineering works in Brussels and other Continental cities. He was fifty-eight years of age, and was well known throughout Cheshire and Lancashire.—*Macclesfield Courier.*

MR. HAMILTON BEATTIE.—The death has just occurred of Mr. William Hamilton Beattie, architect, Edinburgh. He was a son of the late George Beattie, who first came into prominence in his profession by securing by competitive design the commission for the erection of the Craiglockhart Poorhouse. In the carrying out of those plans, Mr. Hamilton Beattie was associated with his father, and from that time dated his first entry into the firm. Since then he has accomplished a large amount of work. In later years his services have been much sought after as an expert and skilled witness in connexion with local and Parliamentary inquiries and valuations. He has been the chief expert adviser to the City of Edinburgh all through the North Bridge-street arbitration. For many years he undertook similarly important duties, not only for the Corporation, but for the North British Railway Company, who engaged him as their chief adviser in numerous arbitrations. On Princes-street there are several examples of his work, viz., the Royal Hotel, the Clarendon Hotel, the Central Hotel, Charles Jenner & Company's buildings, and the new North British Station Hotel, in process of erection. He was also architect for the northmost section of the new Commercial Bank Buildings in North Bridge-street; the Royal Insurance Buildings, George-street; the Imperial Hotel in Market-street; the Marine Hotel, North Berwick; and Pattison's bonded stores at Bonnington were built from his designs, and the Waterloo Hotel has been reconstructed as railway company offices from his plans. Now that a system of cable traction is being carried out through the city, it is interesting to recall that it was largely owing to Mr. Hamilton Beattie the cable system was first introduced into Edinburgh, for he was not only the engineer of the first line to Goldenacre, but he, along with Mr. Mann, S.S.C., was the original promoter of the company. Mr. Hamilton Beattie, who was fifty-five years of age, was a widower.—*Scotsman.*

GENERAL BUILDING NEWS.

ST. MARK'S CHURCH, WASHWOOD HEATH, WARWICKSHIRE.—The last stage in the erection of St. Mark's Church, Washwood Heath, has now been entered upon, and on the 26th ult. the memorial stone was laid. The work was commenced in 1890, but the part then carried out included merely the chancel. Four years later, two bays of the nave and aisle were added, and now it has been found possible to enter upon the work of adding the remaining bays, baptistry, and steeple, which were provided for by the plans of the architect, Mr. J. A. Chatwin. The church when completed will consist of a chancel, 30 ft. by 19 ft., on the north side of which will be an organ chamber and vestry, and on the south side a chancel aisle. The nave will be 66 ft. 6 in. long by 21 ft. wide, with north and south aisles 10 ft. wide, while underneath the tower, which will be 110 ft. high, will be an entrance lobby and the baptistry. The materials used in the construction have been red brick, with Bath stone dressings. Altogether the church will cost about 6,000*l.*

RESTORATION OF ALL SAINTS, METTINGHAM, SUFFOLK.—This parish church was reopened by the Bishop of Norwich on the 23rd ult. after restoration. The exterior flint and stone work has been restored and made good, the old flat tiles on the roof have been replaced with slates, and the lead on that part over the nave and aisle has been taken off and recast. The interior of the edifice has been reseated in pitch pine, and in the chancel two seats have been added, and their carved oak fronts lengthened. The old brick paving has been removed, and a wood block floor laid in its place. On the south side, the lobby entrance has been converted into a vestry, laid with wood block flooring, the old vestry having been pulled down. At the north entrance a lobby has been added. The windows have all undergone treatment. Some have been renewed and others restored, whilst those which had formerly been bricked up have been opened out, and all have been reglazed with square clear glass. The walls have been recoloured, and the oak work cleaned and oiled, and the church is now warmed by hot air. During the progress of the work two piscinas were discovered, one in the chancel and one in the south aisle. The work has been carried out by Mr. A. D. Botwright, builder, of Bungay, from plans and specifications prepared by Mr. W. A. Coombs, architect, of Charing Cross, London.

CHURCH OF THE SACRED HEART, OMAGH, IRELAND.—This church is now rapidly approaching completion. The carving and sculpture work has been carried out under the supervision of Mr. H. Turner Hems (representing Messrs. Harry Hems & Sons, of Exeter) and from the designs of Mr. William Hague, of Dublin, the architect.

WESLEYAN CHAPEL, ELMSWELL, SUFFOLK.—This building is situated near the road leading from Elmswell to Woolpit, and has been erected upon the site of the old chapel. The new structure is about 43 ft. 6 in. by 25 ft., and the extreme height is 31 ft. The chapel has a school-room attached, and a revolving shutter separates one from the other. The main portion of the building is occupied by the chapel, 34 ft. by 24 ft. At the front there is a porch. Messrs. Eade & Johns, of Ipswich, were the architects, and Messrs. R. Hogg & Son, of Coney Weston, were the builders.

PROPOSED CONGREGATIONAL CHURCH, WEST HARTLEPOOL.—It is proposed to erect a new Congregational Church and schools at the corner of York and Park roads, West Hartlepool. Mr. W. Lister Newcombe, architect, of Newcastle, has prepared the plans.

METHODIST CHURCH, BURLEY, LEEDS.—On the 1st inst. a new Wesleyan Methodist church was opened at Burley. The new church is situated in Cardigan-lane. The premises have been designed by Mr. G. F. Danby, architect, of Leeds, whose design was selected in a limited competition. They comprise a chapel, school-room, infants' room, church parlour, ministers' room, and twelve class-rooms. The school-room and class-rooms, which are to have comunication with the church, are not yet built, but land is reserved for them. The church is built of stone lined with brick, whilst all the internal woodwork is of pitch-pine. The principal doorway has granite columns with carved capitals and moulded arches, terminating in a gable. Over this is a five-light traceried window. At the south-east corner a tower and spire rise to the height of 110 ft. Inside the tower is a stone staircase leading to the gallery, which has three entrances. The chapel is 84 ft. long, 48 ft. across the nave, and 57 ft. across the transepts. There is seating accommodation for 480 persons on the ground floor, and 320 in the gallery. The chancel is separated from the chapel by a moulded arch supported on granite columns, with bases and caps of Caen stone. The chancel is lighted by a circular-traceried window. The open-timbered roof rises to a height of 40 ft. The premises are heated on the low-pressure hot-water system. The cost, including site for schools, is 6,590*l.* The work has been carried out by: C. Myers, masonry; J. Ledgard & Son, joiners' work; H. Boston plumber; Atkinson & Son, slaters; Holmes & Co., warming; and J. F. Ebner, the mosaic tiling.

RENOVATION OF APPLEDORE CONGREGATIONAL CHURCH, DEVON.—Appledore Congregational Church has been reopened after alterations and renovation. The chapel has been reseated with pitch pine seats, a new floor and new windows have been put in, the gallery has been altered, the ceiling renovated, and the outside walls replastered. The work was carried out by Mr. J. Tamlyn, builder, of Appledore; Mr. Sanders, of Barnstaple, being the architect.

BEECHGROVE CHURCH, ABERDEEN.—Tenders, amounting in the aggregate to over 7,000*l.*, have now been accepted from Aberdeen tradesmen for the erection of a new Free Church at Beechgrove-terrace, Aberdeen. Messrs. Brown & Watt, Aberdeen, are the architects. A tower and spire at the principal corner will rise to a height of 175 ft. above the ground level. There will be between the nave and aisles a series of arches of Dumfriesshire red freestone, springing from pillars of polished pink granite, and the walls throughout will be of white Kemnay granite. The church will accommodate 800 persons, and the hall behind 400 persons. The ceiling will be vaulted, and ribbed with wood, and the building will be lighted by clearstory windows on both sides and traceried windows in both gables.

NEW U.P. CHURCH FOR FALKIRK.—A new church is about to be built in Thornhill-road, Falkirk, by the St. James U.P. Church congregation. The building, which is to be of red stone, is in the Gothic style of architecture. The plan consists of a nave 27 ft. wide by 64 ft. long, with transepts on both sides, which, along with the aisles, 10 ft. wide, are separated from the nave by six arches springing from columns, having moulded caps and bases constructed of stone. The chancel, which is situated at the west end, will contain the communion table and elders' seats. The principal entrance, porch, and tower, are at the corner, and the tower rises to the height of 90 ft. The church is to seat 532 persons, and the hall 260 persons. Behind the hall are to be ladies' and gentlemen's retiring rooms, with lavatories in connexion therewith. Kitchen accommodation is also provided, with ranges for social meeting purposes, &c. A gallery is provided at the east end of the nave, and altogether the church will accommodate 632 persons. The buildings throughout will be heated by hot-water pipes. The architect is Mr. G. Deas Page, Falkirk, and the building is estimated to cost fully 4,000*l.*

ADDITIONS, ROMSEY BRITISH SCHOOLS, HANTS.—Some new class-rooms have just been opened at the British Schools, Romsey. The new building is of red bricks and Portland-stone dressings. An entrance-porch for the infants leads to a cloak-room, with red and black tile paving. On the right hand the old school is approached, and on the left is a new class-room, 22 ft. in length, 19 ft. in width, and 14 ft. in height. The girls' school is reached through a similar porch on the south side of the building, with cloak-room of larger dimensions. Here, on the left of the entrance, the old school is approached, and on the right the new girls' class-room, 33 ft. by 19 ft. and 14 ft. high, with raised gallery floor. The plans and specifications were prepared by Mr. John Smith, architect, of Romsey, and the work has been executed by Messrs. Goulding & Son, of the same town.

CHURCH SCHOOL, STANNINGTON, YORKSHIRE.—On the 28th ult., the Church School at Stannington was opened. The old school-house has been pulled down, additional land bought, and on the site a new wing added, new staircases, cloak-rooms, and lavatories have been provided, and the old school-room considerably altered and modernised. The work has been executed by Mr. J. Belfield, contractor, Stannington, under the superintendence of Mr. G. A. Wilde, architect, Sheffield.

BOYS' SCHOOL, WATERLOO, LIVERPOOL.—On the 2nd inst. the cornerstone was laid of a new boys' school in connexion with Christ Church, Waterloo. The site of the new building is at the end of Melrose-road, off the Crosby-road. The plans of the new building have been prepared by Messrs. H. & A. P. Fry, Liverpool, whilst the contract for the erection of the schools has been given to Mr. Councillor James Taylor, of Waterloo. The structure will be of brick, relieved throughout with red stone, brick quoins, and stone dressings on the west or front elevation. A general entrance is provided, with cloak-rooms and corridors on each side, and a room for the headmaster in the centre, near the entrance. In the centre of the building there will be a hall 65 ft. by 30 ft., lighted on each side by means of dormer windows. On both sides of the hall there will be three class-rooms, separated by glazed screens. Each room will be 25 ft. by 24 ft. At the end of the hall there will be a long room, to be divided by sliding screens into two school-rooms—one 34 ft. by 21 ft., and the other 41 ft. by 21 ft., the former to accommodate seventy-two children, and the latter eighty-eight. The total school accommodation in the various class-rooms is estimated at about 500.

JONES'S WEST MONMOUTHSHIRE SCHOOL, PONTYPOOL.—On the 1st inst. Lord Tredegar opened a block of school buildings erected on a site near the Cwm Fields, Pontypool. The building is of red brick with Bath stone dressings, ornamented by two octagonal towers 84 ft. high; it provides accom-

modation for over 200 boys, including seventy boarders. Within the block are comprised the house of the headmaster, a large hall, classrooms, lecture-rooms, chemical and physical laboratories, art-room, and day, bath, and clothes rooms. In addition to dormitories, there is a sick-room. All rooms are heated with hot-water, and there are, in addition, a gymnasium and a covered swimming bath. The architect was Mr. Stock, London, and his designs were carried out by Messrs. Bowers & Co., builders, Hereford, the contract price being 23,340*l.*

CHURCH SCHOOL, SCARBOROUGH.—The opening of St. Martin's Church School at Scarborough took place on Thursday last week. The building affords accommodation for 276 children, and provides for future extension for nearly double that number. The new schools are built of red brick, with stone dressings, with red-tiled roof. They consist of a block of six class-rooms grouped round a central hall. The architects are Messrs. F. A. & S. Tugwell, Scarborough; and Mr. John Barry is the principal contractor. The building is estimated to cost about 4,500*l.*

HOSPITAL, NEWTON ABBOT.—On the 29th ult. Newton Abbot Hospital was opened in East-street. The building is about 200 ft. in length and 48 ft. in width, exclusive of offices. The exterior is faced with Stoney Coombe limestone, with Kingsteignton and Bath stone dressings, lined internally with hollow brickwork. The administrative block is in the centre of the building, having a vestibule, hall, two convalescent rooms, matron's room, kitchen, &c. On the first floor there are four bedrooms, nurses' sitting-room, bath-room, &c.; and the attic contains three bedrooms. The west wing has a ward for twelve beds, 48 ft. by 24 ft., a nurses' duty room, scullery, private ward, board-room, and convalescent room, with all the necessary lavatories, scalding sinks, and bath-rooms. The east wing is similar to the west, with the exception of having a linen closet and an operating-room, with the medical officer's room adjoining. The corridor (96 ft. long and 6 ft. 6 in. wide) and the lavatories are heated by radiators from a boiler in the cellar, which also provides hot water for the baths and scalding sinks throughout. In connexion with the hospital there are a mortuary, a doctor's private room, and an out-patients' room. The work has been carried out by Mr. Hugh Mills, builder, of Newton Abbot, from the designs and under the superintendence of Mr. Samuel Segar, architect, of Newton Abbot.

CONSERVATIVE CLUB, RISHTON.—A new club is being erected at Rishton for the Conservatives. The new building will be fronting to Cliffe-street, and the estimated cost is about 3,000*l.* On the ground floor are a suite of rooms all converging to a large central staircase hall, which is approached by a lobby 8 ft. wide from the principal entrance in Cliffe-street. These rooms will include reading-room, library, card-room, billiard-room, smoke-room, and assembly-room, the latter having two entrances—one from the club and the other from Clifton-street. The stewards' room adjoins the assembly-room. On the first floor there will be a large billiard-room, secretary's or committee-room, and a small lecture-room. The Cliffe and Clifton-street frontages of the club will be faced outside with Yorkshire parpoints and stone dressings; all other outside facings will be of local stone. Messrs. J. C. H. Sandbach and J. Parker, Blackburn, are the architects. Messrs. Noble Bros. are the contractors.

MISSION HALL, BELFAST.—A new hall for the Shankill-road Mission, Belfast, has just been opened. The block of buildings has a frontage of 92 ft. and a depth of 135 ft. In designing the buildings it was sought to avoid long corridors by contriving a central octagonal hall, with galleries round and large dome light. This hall will give access to all the departments of the building, and which radiate from it. The building is divided into seven principal departments. The first of these is a large hall, capable of seating nearly two thousand people, designed in the form of an amphitheatre, with a single gallery. This hall will have entrances and exits from the Shankill-road, and also from Carlow-street. In connexion with the hall are gentlemen's, ladies', and choir and committee rooms and cloak-rooms. The second is a medical mission department, comprising a large waiting-hall, capable of seating about two hundred; a doctor's consulting-room and dispensary, and dressing-rooms. It is entered by the main entrance of the building. The third, or business part of the premises, will consist of four large shops—two on either side of the main entrance—and also offices over these shops. The fourth is a soup kitchen department, with convenience for cooking and supplying food, &c. This department can also be entered directly from the Shankill-road. The fifth section comprises a minor hall and class-rooms. This hall will be situated on the first floor, and will be capable of accommodating 250 people. There will also be several class and committee rooms. The sixth is a social and recreative department. These rooms will be situated on the second floor, and will comprise general parlour, men's reading-room and library, boys' club-room, and girls' guild-room, and also ladies' private sitting-room. The seventh department is the residential training home. This will comprise four separate departments:—(1) A wing, with parlour and bedroom accommodation for gentlemen students, and a corresponding wing for lady students; (2) the superintendent's residence, (3) the lecture hall and class-room departments, (4) the servants' department. Altogether, there will be accommodation for twenty students. Over a part of the building there will be a flat roof, with stair-case communication, so that it can be used as a recreation-ground in the summer months. Mr. W. J. W. Roome was the architect, while the builders' work has been carried out by Messrs. M'Laughlin & Harvey. The steel work was done by Messrs. Moreland & Son, London; the heating by Messrs. Musgrave, of Belfast; and the painting and decorating by Messrs. George Morrow & Son, Belfast.

PROPOSED PUPIL TEACHERS' TRAINING COLLEGE, LEEDS.—It is proposed to erect a pupil teachers' training college on a site in close proximity to the Higher Grade Board School at the junction of Great George-street with Woodhouse-lane, Leeds. It will have a frontage to Great George-street, being separated from the Higher Grade School by an open space. The designs for the building have been prepared by Mr. J. M. Bottomley, architect, of Leeds and Middlesbrough. The basement will be utilised for workshops, in which there will be carried on hand and eye training, the manipulation of wood and iron, and industrial instruction. It is intended, however, to use the basement largely to supplement the work of the laboratories in the Higher Grade School. On the ground floor and the first floor provision will be made for training in a series of class-rooms. The top story is to be organised specially for the development of drawing. The Board hope to arrange special lecture rooms and to provide a complete outfit for the training of teachers in drawing. The site has cost 17,000*l.*, and the building will probably involve a further expenditure of 20,000*l.*—*Yorkshire Post.*

THE TEES CONSERVANCY COMMISSIONERS' NEW OFFICES.—At a meeting of the Plans Committee of the Middlesbrough Corporation, on the 21st ult., a set of plans was submitted by Mr. J. M. Bottomley and Mr. Whipham, joint architects, on behalf of the Tees Conservancy Commissioners, for the new offices proposed to be erected for the Commissioners in Queen's-square, Middlesbrough. According to the plans submitted, the buildings, which will stand on a site practically in the middle of the square on the side opposite to the present Erimus Club, will have a frontage of 72 ft., and will be four stories high. The plans have been approved by the Commissioners. In the basement will be cellarage, storing-rooms, and munition-rooms. The main floor, which will be raised about 3 ft. 6 in. from the level of the outside footpath, is given access to from the main entrance, which stands in the centre of the frontage, and from which a porch is shown to project about 10 ft. forward of the main building. The main floor contains the offices of the secretary and his staff, and for the payers of dues, and also a committee-room and a waiting-room. These and the main staircase are approached through a wide corridor. On the first floor is a Board-room, 50 ft. long and 27 ft. wide, and as high as two ordinary stories of the building, with an ante-room adjoining, and offices for the engineer and his staff. On the second floor will be offices for the engineer's drawing staff and for other purposes of a general character. The whole of the floors are fireproof and, with the exception of the main corridor, will be laid with wood blocks in either oak or maple. The main corridor will be laid in mosaic and the main staircase will be of stone. Each floor will have its own strong rooms. On each floor also is provided lavatory accommodation. To the rear of the building will be a caretaker's cottage. The building is Renaissance in style, in red brick and red terra-cotta. The estimated cost of the buildings is 8,000*l.*

FREEMASONS' TEMPLE, TORQUAY.—On the 1st inst. a Masonic Temple was opened at Tor Hill-road, Torquay. The temple has been built from designs by Mr. W. G. S. Bridgman.

EMPIRE PALACE, WOLVERHAMPTON.—This new building has been erected in Queen-square, Wolverhampton, and extends to Cheapside—taking in the site of the old Empire Palace of Varieties which formerly stood in the last-named thoroughfare. The new palace has been erected by the Empire Company, Limited, the architects being Messrs. Owen & Ward, of Birmingham. Mr. F. Lindsay Jones, of Wolverhampton, is the builder, and Mr. Alfred Higgins has acted as foreman of works.

NEW WING, WHITCHURCH COTTAGE HOSPITAL, SALOP.—The new wing of the Whitchurch Cottage Hospital, which has been added as a memorial of her Majesty's Diamond Jubilee at a cost of upwards of 1,200*l.*, was opened on the 30th ult. The work has been carried out by Mr. R. Powell, of Prees, from designs by Mr. Walter Webb, the original architect of the building.

THROAT AND EAR HOSPITAL, BRIGHTON.—The Duke of Norfolk opened on the 29th ult. the Brighton, Hove, and Sussex Throat and Ear Hospital, which has been erected in Church-street. Messrs. Scott & Cawthorne were the architects (their plans being selected in competition), and the building contract of Messrs. Saunders, for 4,290*l.*, was accepted.

THE EXTENSION OF THE CENTRAL STATION, GLASGOW.—The minutes of the Parliamentary Bills Committee of the Glasgow Corporation contain a memorandum by Mr. A. B. M'Donald, City Engineer, with reference to the scheme of the Caledonian Railway. Mr. M'Donald says the project embodies an enlargement of the Central Station, extending from Gordon-street to Bridge-street, and involving the increased covering of Argyll-street, Ann-street, Broomielaw, and Clyde-place, as well as the construction of a greatly-widened bridge across the harbour to the west of the present railway viaduct. The Argyll-street bridge is to be extended to the corner of Hope-street, whereby the present covering of the street will be practically doubled—the dimensions being increased to 337 ft. along the north building line from the present measurement of 185 ft., and 323 ft. along the south building line as compared with 149 ft. at present. Ann-street bridge will be enlarged from 98 ft. on the north building line to 298 ft., and from 100 ft. on the south building line to 296 ft. The Broomielaw crossing is increased by 185 ft. and 165 ft. on the north and south sides respectively. The new bridge across the harbour is shown at an average width of 137 ft., and the Clyde-place crossing is increased from 53 ft. to 178 ft.—*Glasgow Herald.*

NURSES' HOME, NORTHERN HOSPITAL, LIVERPOOL.—The Nurses' Home of the David Lewis Northern Hospital has now been completed. The home, which forms part of the scheme of the new hospital to be erected out of the David Lewis Trust Fund, is situated at the junction of Leeds-street and Great Howard-street, and has been built in red Ruabon brick. There are three floors, each with twenty bedrooms and a sitting-room, in addition to two smaller sitting-rooms. Each floor is supplied with bath-rooms, lavatories, box-rooms, &c. In the basement are other box-rooms, kitchen, scullery, larder, and a room in which lessons will be given to the nurses in sick cookery. Electric light has been introduced throughout the interior. The joint architects are Messrs. Pennington & Son and Mr. C. W. Harvey, and the building contractors Messrs. W. Thornton & Sons.

GRAND THEATRE, LUTON.—This theatre, which is to be opened on Monday, is a two-tier house constructed on the cantilever system. The whole of the floors are of concrete. There is seating accommodation for about 1,000 persons, and standing accommodation for about 350 persons in addition. The proscenium opening is 24 ft. by 24 ft., and the stage has a total depth of 30 ft., with an extreme width of 46 ft., with an additional area of 5 ft. by 15 ft. on the prompt side. The proscenium opening is fitted with a fire-resisting curtain, and the stage with all latest improvements. Provision has been made for ten dressing-rooms and a band-room, with necessary conveniences. Three refreshment bars have been provided, together with cloak-room and lavatory accommodation. Upon the pit level there are thirteen entrances and exits, including two to the dressing-rooms in case of fire. The theatre is lighted by gas, there being no electric system of lighting at the present time in Luton. The main entrance will be paved with marble mosaic. The exterior is faced with grey Luton bricks, relieved with quoins and dressings of red bricks and St. Aldhelm box ground stone for cornice strings, &c., the ornamental gable being carried out entirely in stone. The whole of the work has been designed and carried out under the superintendence of Mr. C. H. Shoppee, London, while the contractor is Mr. W. G. Dunham.

ADDITIONS TO THE SEAMEN'S HOSPITAL, LONDON.—Some additions have been begun at this hospital, from Mr. Keith D. Young's designs and plans. The hospital stands upon some reclaimed land lying between the Royal Albert Docks and Connaught-road railway station. The enlargement is intended for purposes of a medical school, which, under a new scheme, will be attended by colonial doctors and other students of malaria, beri-beri, dysentery, and other tropical diseases. There are at present only twenty-three beds. The patients come from all parts of the world.

NEW BUILDINGS IN ABERDEEN.—Among the plans approved of at the last meeting of the Town Council's Plans Committee were those of a new public school at Westfield (Mr. A. Marshall Mackenzie, A.R.S.A., Aberdeen, architect—cost, 8,000*l.*), and of a block of buildings at Wallfield (Mr. Peter Slessor, architect—cost, 3,000*l.*).

NEW BUSINESS PREMISES, ABERDEEN.—There has just been finished for Messrs. Thomas Ogilvie & Sons, manufacturers, Aberdeen, a large granite building, covering an area of 50 ft. by 150 ft., and having four floors and attics, the height from the basement to the attics being 62 ft. The structure is bounded on three sides by thoroughfares—Dee-street, Dee-place, and Oldmill-road. There are two electric lifts, the whole place will be lighted by electricity, and all the machinery will be driven by electric current from the town's mains. The total cost will be about 20,000*l.* The architects are Messrs. W. & J. Smith & Kelly, Aberdeen; and the contractors for the various works are: mason, Robert Smith; carpenters, Hendry & Keith; slater, George Currie; iron work, McKinnon & Co.; plaster work, Scott & Sellar; plumber, A. B. Robertson; glazier, Mr. Copland; painters, Jas. Garvie & Sons; electric light, R. G. Botting & Co.—all of Aberdeen; motors and lifts, Spencer & Co., Melksham, Wiltshire.

MASONIC HALL, CAMBORNE.—The corner and two memorial stones have just been laid of the new Masonic Hall now being erected for the local lodge

in Cross-street, Camborne. The frontage of the hall is 37 ft. and depth 41 ft. There will be two floors. Mr. Sampson Hill, of Redruth, is the architect; and Messrs. Frank Mitchell, Crowan, and Barbary, Camborne, are the contractors.

SOCIAL CLUBS, BYKER, NEWCASTLE-ON-TYNE.—At 65, 67, and 69, Grafton-street, and at 45, Brinkburn-street, Byker, two social clubs have just been opened by the Mayor. A good deal of preparatory work has had to be done to make the premises ready for occupation. Mr. A. B. Plummer is the architect to the venture, and from his designs the interior of the Grafton-street building has been entirely remodelled. The front lower portion of the hall will still be occupied by the Salvation Army. Behind this three rooms have been formed, which are to be let to benefit societies. For the use of members there is a reading-room, 26 ft. by 11 ft., on the ground floor, and upstairs there is a games-room, 25 ft. by 18 ft. The upper portion of the old hall has been converted into a billiard-room. It contains six new tables. The Brinkburn-street Club is a corner house and shop, at the junction of Carville-road with Brinkburn-street. The shop has been let off. A reading-room has been constructed, 23 ft. by 15 ft., and also a games-room. Upstairs is a billiard-room, 30 ft. by 21 ft. 6 in. Opening out of the billiard-room is a smaller apartment, which will be used as a reading-room. The alterations to the premises have been carried out by Mr. Walter Baston, the plumbing has been done by Councillor Arthur Scott, and the painting by Mr. Richardson.

SANITARY AND ENGINEERING NEWS.

TRIBUTARY SEWERAGE, LEICESTER.—Mr. E. A. Sandford Fawcett, Local Government Board Inspector, held an inquiry at the Town Hall, on the 29th ult., in reference to applications by the Leicester Town Council to borrow 30,629*l.* for sewerage purposes, and 250*l.* for the purchase of land for street improvements. The Town Clerk said that in compliance with instructions from the Highways and Sewerage Committee, the Borough Surveyor (Mr. E. G. Mawbey) prepared a report on the condition of the tributary sewers of the borough. Thirty-three and a quarter miles of the existing tributary sewers had been examined in 421 streets in the borough, and about thirty-two miles of sewers in 408 of those streets had been found to be exceedingly defective. In the Borough Surveyor's opinion it was absolutely necessary to abolish the defective sewers and replace them by new sewers of modern design and construction. The Borough Surveyor estimated the approximate cost of a scheme of new tributary sewers for the whole of the borough at 128,301*l.*, and the Council on July 26 adopted the Surveyor's recommendation that such a scheme should be undertaken. It was proposed, however, to carry out the scheme in four sections, each section comprising about a quarter of the area of the town. The first section which it was proposed to deal with, and to which the present application of the Board related, comprised about eight miles of sewers in the streets in the district bounded by Humberstone-gate, Humberstone-road, Belgrave-gate, and the Willow Brook. He might add that the sewers to be superseded were known as Wicksteeds, and were laid about forty-three years ago under the authority of the Leicester Sewerage Act of 1851.—The Borough Surveyor then gave evidence. Within the last eleven years, he said, the town had been provided with new main intercepting sewers, a sewage pumping station, and sewage disposal works. A main storm outfall sewer had also been constructed to remedy the previous backwatering of sewers and the flooding of basements. It had now become absolutely necessary to deal with the existing tributary sewers in the old part of the borough. He had examined these sewers by the sinking of 1,436 trial holes, and found that about 32 miles of them, in 408 streets, were exceedingly defective, and should in the near future be replaced by sewers of modern design and construction. Of the 32 miles of defective sewers in the whole of the four districts, nearly 29 miles were brick sewers, and rather over 3 miles pipe sewers. In the No. 1 district, now proposed to be sewered, there were about 7½ miles of defective sewers to be abolished, of which 7 miles were brick sewers and about ¼ mile pipe sewers. Only in very few instances was mortar found in the joints in the lower half of these sewers, and many had none in the crowns. They were constructed with wide cross-joints, very distorted in section, and undulating in gradient. Some had hardly any fall, and in a few places the fall was even the wrong way. The pipe sewers were just as unsatisfactory, and were defective in a number of ways, and the ground around the sewers was found more or less contaminated by the sewage which had escaped through the open joints. In the section under consideration there would be 7·45 miles of new pipe sewers, and 0·44 miles of new brick sewers, and the scheme was on the combined system of sewerage, because he considered it inadvisable to adopt the separate system in these old and densely-populated districts. The narrowness of the streets, the great number of dwellings and business premises which abutted directly thereon, and the large amount of traffic fouled the carriage-ways and the footways and gulleys to a much greater extent than in the more modern and outlying parts of the borough, where the streets were wider and the efficient private sanitary arrangements prevented the fouling of the surface drainage. Ventilation would be provided for by means of cast-iron shafts fixed on buildings, and carried up above the levels of the ridges of the roofs, arranged so as to be clear of all windows and chimneys. Additional ventilation would also be provided for the portions of the existing intercepting sewers in this district by means of similar cast-iron shafts, and in a few cases by brick shafts of larger area. The system of surface grids ventilation had been well tried in Leicester under all conditions, including those most favourable to it, with the result that it had been found a fruitful source of intolerable nuisance by reason of the offensive emanations from the grids, and strenuous complaints from the public were a very common and frequent occurrence.—There was no opposition to any of the schemes.

SEWERAGE, GOMERSAL, YORKSHIRE.—On the 29th ult. an inquiry was held at Gomersal by Mr. H. H. Law, an Inspector of the Local Government Board, with reference to the application of the Gomersal District Council for sanction to borrow 10,000*l.* for purchase of the undertaking of the Gomersal Water Company, and 8,000*l.* for sewerage and sewage disposal. With reference to the drainage, Mr. William Prest, C.E., of Bradford, assistant to Mr. John Waugh, C.E., explained the plans in detail.

THE EAST LONDON WATER SUPPLY.—The Directors of the company, at their meeting on the 1st inst., resolved, on the advice of their engineers, to resume the constant supply.

PUBLIC IMPROVEMENTS, SCARBOROUGH.—Mr. H. H. Law, Inspector under the Local Government Board, held an inquiry in Scarborough Town Hall on the 30th ult., with reference to an application by the Town Council for power to borrow 4,471*l.* for purposes of public improvements. The Town Clerk (Mr. J. E. T. Graham) stated that 2,879*l.* was required to purchase 3¼ acres of land in Manor-road for a recreation ground.

DEVONPORT SEWAGE WORKS.—Lieut.-Col. Albert C. Smith, R.E., Local Government Board inspector, held an inquiry at the Municipal Offices, Ker-street, Devonport, on the 29th ult., in connexion with an application for sanction to borrow 4,500*l.* for sewerage works. In the course of the proceedings Mr. J. F. Burns, Borough Surveyor, explained the proposed scheme.

NEW YTHAN BRIDGE AT FYVIE, N.B.—The new bridge built by the Turriff District Committee of the Aberdeen County Council over the Ythan, at Fyvie, was opened on Monday. It is built on the site of the previous one, which had stood for about 150 years, has been constructed by Mr. James Ferguson, contractor, Bogtama, Fyvie, from plans prepared by the County Engineer, Mr. John D. Watson. The bridge has a length from roadway to roadway of 63 ft., and a clear width of 20 ft., which is double the width of the old bridge. It has two spans, each of which is 23 ft. 3 in. wide.

NEW BRIDGE OVER THE WEAR.—A new foot-bridge has been built over the Wear. The bridge is built on the site of the old ferry, which it will supersede, immediately in front of Lumley Castle. The bridge is a light structure of iron and steel, and stands upon four steel columns driven into the bed of the river at each side. Mr. David Balfour, of Newcastle, was the engineer, and the builders were Messrs. Head, Wrightson, & Co., Stockton.

STAINED GLASS AND DECORATION.

DECORATIONS, ST. PETER'S ROMAN CATHOLIC CHURCH, BRIDLINGTON.—The decoration of the sanctuary of the Roman Catholic Church of Our Lady and St. Peter, Victoria-road, Bridlington, has just been completed by the insertion of a third stained-glass window of two lights, the subject being St. Thomas of Canterbury and St. Helen. The work was entrusted to Messrs. Meyer, of London.

WINDOW, ROLLESBY CHURCH, NORFOLK.—On Advent Sunday a new stained-glass window was unveiled and dedicated at Rollesby Church. The work was designed and executed by Messrs. Cox, Son, & Buckley, of London.

WINDOW, PARISH CHURCH, MORVEN, N.B.—A stained-glass chancel window has been placed in the new Parish Church of Morven, in memory of the late Rev. Dr. John Macleod, of Govan. The window is by Mr. Norman Macleod Macdougall, and has been carried out from the design of Mr. Macgregor Chalmers, the architect of the church.

MEMORIAL WINDOW, BOSLEY, CHESHIRE.—A new stained-glass window has been placed in the Church of St. Mary the Virgin, Bosley, by Mrs. Bullock, in memory of her husband, Abraham Bullock. The subject illustrated is "The Presentation of Christ in the Temple." The window has been executed by Messrs. R. B. Edmundson, of Manchester.

MEMORIAL WINDOW, ST. GILES' CATHEDRAL, EDINBURGH.—One of the large windows on the south side of the nave has been completed in stained glass, with subjects, according to the general scheme of the St. Giles' Board, illustrative of the life of Joseph. The window is about 20 ft. in height, subdivided by the stonework into eight compartments and tracery. The window is placed by Mrs. Stewart in memory of her husband. Messrs. A. Ballantine and Gardiner carried out the work.

WINDOW, ST. MARY'S, WOLVERHAMPTON.—The large aisle window in this church has been filled with stained glass to commemorate the Queen's Diamond Jubilee. The lights are divided into an upper and lower section, with canopies and bases of the Perpendicular style. There are four subjects illustrating the active ministry of our Lord, comprising the Baptism of Christ; and three typical scenes of the ministry, viz., the marriage in Cana of Galilee, the call of Simon and Andrew, and the Parable of the Sower. The work has been carried out by Mr. H. A. Hymers, of Chelsea.

FOREIGN.

FRANCE.—It is said that steps are being taken, in view of the future Salons, to amalgamate the Société des Artistes Français and the Société Nationale des Beaux-Arts.——At the last meeting of the Académie des Beaux-Arts, Sir Edward Poynter was elected "Correspondant étranger" in place of Sir Edward Burne Jones.——Last Sunday the monument to Dr. Charcot was inaugurated in the Place Salpêtrière. It is the work of M. Falguière, sculptor, and M. Samson, architect.——Important works are being carried out by the Railway Company "de l'Est" for enlarging the station on the Boulevard de Strasbourg. The works are being carried out under the direction of M. Siegler, engineer, and M. Gouny, architect.——M. Dupré, architect, is now building on the site of the old Saint Germain market, a large building which is to be the hall for the examination of the students of the municipal schools. The principal façade is very simple. The interior arrangements are very good, with large well-lighted examination halls.——The jury on the open competition for a group of school buildings at Clichy has awarded the first premium to MM. Durand & Bidard, the second to MM. Maistrasse & Berger, and the third also to them, as they sent in two different designs. A medal was awarded to M. Bertone.——The exhibition of the Société des Amis des Arts of Angers will be held from January 15 till March.——A new room filled with furniture is being arranged at the Louvre. Amongst other things here is the Chinese furniture belonging to Marie Antoinette, toilet articles belonging to Mme. Du Barry, besides mirrors, mantelpieces, and carved woodwork belonging to the Hôtel de la Place Vendome.——A metropolitan railway from Vincennes to the Bois de Boulogne is in process of construction at the west angle of the Place des Pyramides in the Rue de Rivoli. Great excavations had to be made, and the foundations of old stables built by Philibert Delorme for the King have been discovered. They date from the time of Catherine de Medicis. They were demolished subsequently, to make the Place des Pyramides. A large stone gallery has also been discovered, the use of which is unknown.——M. Eugène Barthélemy, architect, of Paris, has just died at the age of fifty-six years. He was a pupil of Constant Dufeux and of the Ecole des Beaux-Arts, and was a member of the Société Centrale des Architectes for sixteen years. Besides numbers of special works, such as hotels, &c., he gave a great part of his laborious career to the Municipal Administration as Professor of Drawing in the schools and as Inspector of Architectural Works. He carried out the enlargement of the Ecole Normale d'Institutrices, and the group of school buildings in Rue Geoffroy-Lasnier.

AUSTRALIAN WATER SUPPLY.—In all parts of Australia increased attention is being given to the question of water conservation, especially in Sydney, where the rapidly increasing metropolitan and suburban population has made a regular and copious water supply a matter of vital importance, the result being that at the present time the capital of New South Wales claims to possess the largest and purest water supply owned by any city of the same population in the world. The sources of supply are the waters of the Nepean, Cataract, and Cordeaux rivers, draining an area of 354 square miles, a catchment enjoying a copious and regular rainfall. The off-take works are built at a height of 437 ft. above the level of the sea, and the water flows through a series of conduits—partly tunnel, partly open canal, and in places wrought-iron aqueducts—to Prospect, a distance of 40 miles from the farthest source of supply. Here a storage reservoir has been constructed, covering an area, when full, of 1,261 acres, and capable of holding about 11,000 million gallons, of which nearly 7,000 millions are available for supply by gravitation. The top water-level is 195 ft. above sea-level. The dam is 7,300 ft. long, 30 ft. wide on top, and is carried to a height of 84 ft. at the centre; it contains some 2,316,500 cubic ft. of earth-work, and its water face is covered with heavy bluestone pitching. The conduits above Prospect have a capacity of 150 million gallons per day, and for 10 miles below the reservoir the capacity of the canals and pipes equals a maximum of 50 million gallons, while for the last 11 miles the pipes have a capacity of 17·5 million gallons daily. The water flows from Prospect to other large reservoirs in and around Sydney, one of these, situated at Pott's Hill, covering an area of nearly 25 acres, and having a storage capacity of 100 million gallons. Here the water passes through

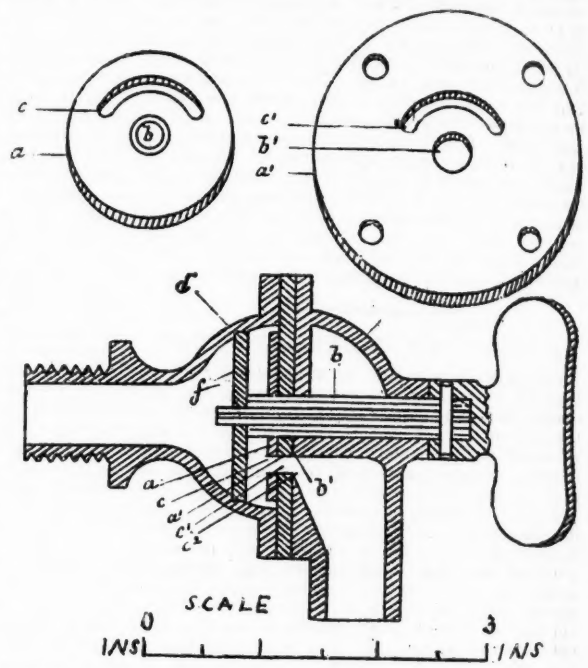
a series of copper-gauze screens, and is then conducted by two mains into Sydney. The reservoir at Petersham, a Sydney suburb, is 166 ft. above high-water mark, and has a capacity of 2,157,000 gallons. Another at Crown-street, in Sydney, has a capacity of 3,250,000 gallons. Other reservoirs have a capacity of about 1,000,000 gallons each. The total volume of water stored in these reservoirs is 106,770,000 gallons. This is exclusive of the water storage at Prospect. Recently a new covered reservoir, the largest in the southern hemisphere, has been completed at the Centennial Park, in Sydney. It covers an area of over 31 acres, and contains, when full, 18 million gallons. The depth of water above the draw-off level is 20 ft., and the top water surface is 245 ft. above sea level. The walls are of brickwork; the floor and partition wall of sandstone concrete, rendered with cement mortar. A special feature of this reservoir is the roof, which is constructed with groined arches of coke-cinder and cement concrete, supported by brick pillars 23 in. square and 20 ft. apart each way. This form of construction was decided upon as the most economical and suitable after many designs of various kinds of arched coverings had been prepared, and much consideration given to the matter. As the roof had to be designed not only to carry the protective covering of sand and turf, but also a possible dense crowd of people, it was necessary to make it unusually strong. The groined arches are, therefore, 6 in. thick at the crown and 24 in. at the springing, and to provide against unequal loading they are connected throughout with wrought-iron ties. A salient reason for adopting the groined system was that free and thorough ventilation is effected in every direction, the hollow columns of the surrounding railing forming inlets, and the central towers exits for the air. The interior of the reservoir is lighted for cleansing purposes by sixty-four roof lights. Both ventilation and lighting are so carried out as to exclude dust and other atmospheric impurities. The ornamental railing, pavilion, footpaths, &c., were introduced with the view of the roof being used as a recreation ground, and preventing any injury from being done to the general appearance of the park, which was one of the conditions under which the site was granted. Practically a water famine is impossible in Sydney, although a succession of rainless years, a most improbable occurrence, might lead to restrictions being placed, as a matter of precaution, on the daily supply. The purity of the water is beyond question, and the greater portion of the city and suburbs being supplied by gravitation, the storage of water in house tanks is virtually unknown.

MISCELLANEOUS.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.—An arrangement has been made by which the private practice, established in Manchester in 1850 by the late Mr. William Radford, M.Inst.C.E., and carried on until recently by him in conjunction with his son, Mr. William Harold Radford, under the style of Messrs. William Radford & Son, Civil Engineers, Surveyors and Valuers, at 19, Brazennose-street, Manchester, has been transferred to Mr. Joseph Swarbrick, Assoc.M.Inst.C.E., of Temple Chambers, 33, Brazennose-street, Manchester, consequent upon the appointment of Mr. W. H. Radford to the position of Bridgemaster for the County of Lancaster, in succession to his father.

ABERDEEN GRANITE TRADE.—In view of the great falling-off in the granite trade of the city with the United States, we have pleasure in recording distinct increases in other branches of the industry. The following figures applicable to the exports from Aberdeen Harbour during the last financial year (ended September 30, 1898) bear out this, and it is otherwise known that a large amount of business has been done during the present year by the monumental works, chiefly in the way of making ornamental fronts for buildings in the large towns in England and elsewhere. Granite goods for America are shipped *via* Glasgow, but the statistics given below as to Aberdeen Harbour apply to exports for most places abroad, and also, of course, to such destinations as London, Newcastle, &c. The exports of stone from the port during the year mentioned may be summarised as follows:—Of causeway stones there were exported 35,284 tons, being a rise of 3,881 tons upon the record for the previous year. As the average value of the stones may be taken at *1l.* a ton, the sett-making industry in this district is evidently still a considerable one. Then of kerb, pavement, and building stones there were exported during 1897-8 no less than 4,479 tons, being an increase of 243 tons over the figure for the year preceding. The total weight of chips, rubble, &c., exported was 14,616 tons—a rise of 3,399 tons. The exports of polished granite again amounted to 9,349 tons, an increase of 367 tons. This item is of importance, as the value of polished granite for elaborate work is probably *20l.* per ton, while the average value for all grades of manufacture is moderately estimated at *14l.* per ton. Of granite waste slabs ("adamant") there was exported last year 2,898 tons—a rise of 1,058 tons over the previous year. The "boom" in the building trade in Aberdeen, it may further be remarked, is illustrated by the striking rise in the imports of timber, which for 1897-8 amounted in all to 78,359 loads of 50 cubic ft. each, being a rise of 18,319 loads over the preceding year. The recent strike and lock-out at the local quarries do not seem to have affected the monumental trade. At least the imports of rough foreign granite were not materially altered. These amounted to 12,619 tons, being a fall of only 1,205 tons on the record of 1896-7. Most of this rough foreign granite comes from Norway and Sweden, and owing to the variety of colour available, it is largely used for the polished fronts above-mentioned, as well as for cemetery monuments for the United States.—*Aberdeen Free Press.*

A NEW WATER-TAP.—The patentee and inventor of this tap, Mr. W. Duthie Crabb, especially intends it as a durable hot-water tap. The accompanying diagram will only require a few words to explain the action of the tap: *a* is a revolving metal plate fixed to the spindle of the tap and turning with it; a^1 is a combination seating of indiarubber compound or fibre or compounds of other matter (the patentee says that he has found these the most favourable materials for the purpose) which is fixed, and the water-way is opened or closed by the coincidence or otherwise of the segmental openings in the metal plate and washer, on the hit-or-miss principle. A special feature, however, is the perforated spring disc *f* (the perforations are not shown), which is fixed to the end of the spindle, and which is supposed to assist, by the pressure of the water on its solid portions, in keeping the rotating disc closely pressed against the washer when the tap is closed, and thus keeping it water-tight. We should rather doubt the efficiency of the perforated disc in assisting in the pressure, which we are inclined to think would operate as much on *a* without the intervention of *f*; and *f* would form an additional check on the water-way, which is rather throttled as it is. It will probably be objected also that, although the tap may very well be turned off slowly so as to close the water-way gradually, if turned off quickly, it will have the usual effect of cutting short the flow with a jar. The tap is however ingenious, and may be a step to some further improvement.



THE LONDON COUNTY COUNCIL'S WATER SCHEME.—In our "Note" of November 26 last (p. 477 *ante*) we commented upon this project. On referring to the Council's "London Water Aqueducts and Works" Bill we find that they propose to construct a storage and service reservoir at Borehamwood, Hertfordshire, between the Midland Railway line and the road from Elstree to Shenley, to be comprised between two embankments. The main aqueduct to that reservoir from a reservoir on the river Yrfon, Brecknockshire, is planned to pass through Builth, Hay (Brecknockshire), Dorstone, Madley, Blakemere, Tiberton, Harewood, Pencoyd, Ross (Herefordshire), East Dean, Newent, Hartpury, Maisemore, across the Severn, Sandhurst, Leckhampton, Churchdown, Coberley, Chedworth, Stowell, Northleach Rural District (North Gloucestershire), Milton, Ascott, Charlbury, Heyford, Hethe (North Oxfordshire), Tingewick, turning southwards, Padbury, Mursley, Stewkeley, Drayton, Wing, Mentmore, Ivinghoe (North Buckinghamshire), Little and Great Gaddesden, Hemel Hempstead, Abbot's Langley, Shenley, Ridge, Aldenham, and Elstree (South Hertfordshire). Branch aqueducts from the termination of the main aqueduct will be made to Scratch Wood, Edgware, and thence to Selvage Lane, Hendon, with new roads in the Shenley, and Radlett districts. For filter-beds the Council propose to take lands in Edgware and Hendon, on the south-west side of the Midland line, between Borehamwood tunnel and Mill Hill station, and for purposes of the works to take portions of commonable lands at Cefn Gafeos, 2 acres; Hay, 1¼ acres (Brecknockshire); Scudamore, 5 acres; Allt, 1¼ acres (Herefordshire); Mitcheldean, 2 acres (Gloucestershire); Hardwick Heath, 1 acre (Oxfordshire); Ivinghoe, 9 acres; Hudnall, 8 acres; and Brickett Wood Common Meadows, 3½ acres (Herts). The Bill empowers the Council to enter into contracts for supplying water to Local Authorities, companies, and other persons, within certain limits, along the routes of their aqueducts, to raise money by creating stock or annuities, or to use money standing to the credit of the Consolidated Loans Fund, for purposes of the Act, and to keep separate accounts of expenditure and revenue in respect of the undertaking.

PROPERTY SALES.—There are offered for sale (1) a freehold ground-rent of *2,500l.* per annum secured upon a block of flats, Bedford-court Mansions, with frontages to Bedford-avenue (formerly Caroline-mews) and Bloomsbury-street, covering an area of about 20,650 ft. superficial. Bedford-court Mansions were built after the designs of Mr. Allan F. Vigers, in conjunction with Messrs. Martin & Purchase for the planning. On December 7, 1895, we published an illustration of the block facing Tavistock-street (since renamed Bedford-avenue) and Charlotte-street. Some months ago a freehold ground-rent of *2,500l.* arising out of a portion of the estate was sold for, we believe, *82,000l.*, the Duke of Bedford having disposed of the fee-simple of that portion of the property to the ground-lessees. (2) The estate of Hassendeanburn, near Hawick, Roxburghshire, including four farms, extending over about 1,200 acres, in the parishes of Minto and Lilliesleaf. The mansion, rebuilt twenty years ago, after the plans and designs of Messrs. Wardrop & Reid, of Edinburgh, stands on the Teviot's north bank, and commands a fine prospect, southwards, of the river and dale. (3) By order of the mortgagees the premises, held for an unexpired term of thirty-two years, on the east side of Hanover-square, at the corner of Hanover-street, occupied by the St. George's Club.

STATUE, TIPPERARY.—On the 27th ult. a statue of Charles Kickham was unveiled at Tipperary. The statue is the work of Mr. John Hughes, A.R.H.A., Dublin, and is of bronze.

DRAIN TESTING.—A meeting of the Royal Scottish Society of Arts was held in the hall, 117, George-street, Edinburgh, on the 28th ult., Professor W. Ivison Macadam, F.R.S.E., Vice-President, in the chair. Mr. Gilbert Thomson, C.E., Glasgow, read a paper on "A Suggested Standard for Drain Testing." Since the desirability of having an air-tight system of house drainage was first recognised, many improvements had, he said, been made both in construction and in methods of testing. At present the standard of construction appeared to be rather above the standard of ordinary testing. The early tests, such as paraffin and peppermint, being only smell tests, did not indicate the exact position of any leakage, and had been superseded by the universally-known smoke test. That test, although very useful, had one serious weakness, in that it gave only a negative proof of soundness; and although it was very common to find it reported that drains had been smoke-tested and found all right, all that could really be said was that nothing was found to be wrong. This was not the same thing, and might be very different. In testing old work, it was perhaps the best that could be done, but for new work it was desirable to have a positive and not only a negative proof of soundness. Two such tests were available and frequently used—the water test and the air test. The latter was the more generally applicable, and might be made a standard to which all drains and pipes put in under building by-laws might be made to conform. So far it had usually been applied in a rough-and-ready fashion, and even then was much superior to smoke. It could easily be made to give exact numerical results, and the suggestion was that by-laws and specifications should not stipulate in general terms that the work was to be satisfactory, but that it should stand an air-pressure of so many inches of water, and should retain it without perceptible loss for so many minutes. Mr. Thomson exhibited and illustrated an instrument designed to apply such a test.

THREE TOWNS MASTER BUILDERS.—At a recent meeting of the Plymouth, Devonport, Stonehouse, and neighbourhood Master Builders' Association (affiliated with the National Association, and also with the West of England and South Wales Federation of Building Trades Employers), it was resolved—"That the members of this Association do congratulate Mr. Alderman Pethick, J.P., on his election to the Mayoral chair, feeling assured that the dignity of the chief magistracy will by him be upheld with credit alike to the town and to himself. And the members feel especial pride in offering their hearty good wishes to the Mayor, whose career has

been so long and honourably connected with the interests of the Association." It was further resolved —"That the following gentlemen be a deputation to wait upon the Mayor and hand him a copy of the foregoing resolution, viz.:—Messrs. W. G. Lapthorn, Chairman; John Wakeham, Vice-Chairman; C. S. Tozer, Treasurer; A. N. Coles, Albert Lethbridge, and the Secretary, Mr. Gabriel." In accordance with this resolution the deputation waited on the Mayor on the 28th ult. Mr. Lapthorn expressed the pleasure it gave him to introduce them to the Mayor, and the general gratification of the Association at the elevation of Mr. Pethick to the Mayoralty. He referred to the possibility that the meetings of the National Association of Master Builders might be held in Plymouth next year. The Mayor thanked them for the kindness of their words, and begged them to convey to the Association suitable acknowledgments. In reference to the possibility of which Mr. Lapthorn had spoken, he would do his utmost for the comfort of the members of the National Association on the occasion of their visit to Plymouth.

DUBLIN SOCIETY OF ANTIQUARIES.—Some interesting papers were read at a meeting of the Society of Antiquaries which was held on the 29th ult. in the Dawson-street Hall of the Royal Irish Academy, Mr. Thomas Drew presiding. Mr. F. Elrington Ball, read a paper on "Some Residents of Monkstown in the Eighteenth Century," in which a good deal of information was conveyed as to the general state of that suburban resort considerably more than a century ago, and an account was given of some of the leading denizens of the Monkstown of that day. Mr. J. A. Musgrave, M.A., followed with a paper consisting mainly of extracts from the diary of William Balkley, a grand juror of the Isle of Anglesea, who flourished more than a hundred and fifty years since, and who resided at Boyadda, near Amlioch, in that county. Mr. P. J. O'Reilly read a paper on "The Island Monasteries of the Shannon." It was illustrated by from fifty to a hundred lantern slides.

THE GLASGOW BUILDING EXCHANGE AND THE TECHNICAL COLLEGE.—On the 2nd inst. Colonel Bennett gave the first of a series of monthly papers that have been arranged to be delivered under the auspices of the Glasgow Building Trades Exchange during the present winter. Colonel Bennett's paper was on the subject of "The relationship the Building Exchange ought to have to the Technical College." In the course of the paper he said that what he felt as to the training of the technical schools was that youths learned no doubt much good, but also a great deal of bad for want of capable practical teachers. It was necessary to impress on apprentices that they must do the roughest or meanest kind of work before they acquired sound practical knowledge. Why was it that in this the boasted second city of the Empire they had been the last to provide sound technical schools worthy of the name? He blamed, first, the merchants; second, the Chamber of Commerce; third, the Merchants' House; fourth, the Trades' House, the City Fathers and themselves; and lastly, the workmen. "What was everybody's business was nobody's," and he denied emphatically that after twelve years' existence the high ideal set up by the founders of the Glasgow and West of Scotland Technical College had been reached. According to the statistics of the Technical College last year, over 216 plumbers attended the lectures, 112 attended the workshop classes, 201 the painting classes, and 316 the building construction classes. Would any one say that this was a fair proportion for the building trades of Glasgow? Yet if more had applied they would have had to be taught in the streets, as there was no accommodation. After dwelling on the excellent system of technical education in Germany, the Colonel continued that if we were to keep pace with the great Teutonic race, the sooner the whole community awakened from the Rip van Winkle policy they had been pursuing the better for the rising generation. As he had said, the whole community were to blame for neglecting the work that lay before them. What was the remedy? Let them at once build a Technical College worthy of the name, making it large enough to accommodate 10,000 students. Then let there be, so far as the building trades were concerned, a duly qualified set of practical teachers and a visiting committee sent from the Exchange—a committee, that was, of skilled and qualified workmen, who were willing to visit the school at least once a week to see that the boys were being taught on proper lines. He advised that the Education Committee of the Building Trades Exchange should take this matter up to put themselves in touch with the management of the Technical College and obtain, if possible, some share for the Exchange in the scheme of management.

THE CARPENTERS' COMPANY.—At the examination in building and sanitary construction held by the Carpenters' Company in their Hall last week, particulars of which we gave in our issue of November 26, thirty candidates entered, which is an increase on the numbers of the two previous years. The Company lay great stress on the practical nature of their examinations, and no candidate who is not a practical man is able to obtain the certificate. The following is a list of the successful candidates, arranged in order of merit:—T. Cherrill Way (Gold Medal); F. Hartnoll, H. C. Remnant, Jno. Sanderson (Silver Medals); E. F. Brown, T. E. Kinch (Bronze Medals); A. Harrington, W. H. Masters, J. G. Anderson, C. R. Tinson, L. Bate, A. Norton, W. J. Andrew, S. W. Hayward, A. C. H. Pendlebury, C. R. Fenn, T. R. Tanner, Geo. Gôut (Certificates).

GENERATION AND PURIFICATION OF ACETYLENE.—Last Monday Professor Vivian B. Lewes delivered the third of a course of four lectures on "Acetylene" at the Society of Arts. Owing to the large attendance some of the audience had to find accommodation in the vestibule adjoining the lecture-room. Professor Lewes confined himself in this lecture to the discussion of the various types of generator and of the methods of purifying the gas. He said that while some generators yielded fully 5 cubic feet of acetylene per pound of carbide decomposed, others yielded as little as 3¾ cubic feet from carbide of the same quality; and that the yield from most of the generators now on the market varied within those limits. An important feature in connexion with the generation of acetylene is the gas pressure which accumulates in the generator during the decomposition of the carbide. In some generators the gas pressure does not exceed from 2 in. to 4 in. of water, while in others it rose to 8 in. or 10 in. or even higher. As a general rule, the greater the pressure in the generator the less is the yield of acetylene per pound of carbide. An indication of the action which has taken place in the generator is to be found in the slaked lime formed by the decomposition of the carbide. If the lime is of a uniform white colour and free from hard lumps, the decomposition has, in all probability, proceeded in a satisfactory manner; while, if it is yellow, the heat developed within the mass of decomposing material has been too great, and some of the acetylene itself has been decomposed or polymerised. In some generators Professor Lewes had known the temperature of a portion of the decomposing carbide to rise above the melting point of zinc, and in such cases the waste lime was dark brown, or almost black, owing to the formation of tarry substances, resulting from the polymerisation of some of the acetylene. With regard to the purification of the gas, Professor Lewes said that the white "haze" which was sometimes observed in a badly ventilated room in which acetylene was burning, was due to water condensed in the presence of phosphoric acid; and that if the gas was purified from phosphoretted hydrogen, no "haze" would be formed when the acetylene was burned. Professor Lewes remarked that there were several processes by which the gas could be purified, and showed a purifier in which cuprous chloride dissolved in hydrochloric acid was used. This, he said, would remove phosphoretted hydrogen, sulphuretted hydrogen, and ammonia; and another arrangement could readily be added which would dry the gas before it passed to the burner.

INTERNATIONAL BUILDING TRADES' EXHIBITION.—We are informed that the whole of the ground floor space for this exhibition has already been let, and more than half of the gallery accommodation. The exhibition will remain open for ten days instead of a week as previously, and a full week will be given for erecting exhibits. It is to be hoped that this readiness will be rendered complete by having the catalogue ready on the opening day. The exhibition is to open on April 26 and close on May 6.

LEGAL.

INJURY TO BUILDINGS THROUGH OSCILLATION OF TELEGRAPH POLES.

THE case of Christoffer and others *v.* the National Telephone Company, Limited, came before Mr. Justice Lawrance and a special jury on the 2nd inst.

Mr. Wm. Moyses appeared for the plaintiffs, and Mr. Roskill for the defendant company.

Mr. Moyses, in opening the case, said that Messrs. J. C. and G. J. Christoffer were the trustees under the will of the late Mr. Christoffer, the owner of the property in respect of which the action was brought, Mr. Wm. Barrett being the occupier of the property. The action was brought by the plaintiffs to recover damages for trespass committed by the defendant company extending over no less a period than fourteen years, and which had existed unknown to the plaintiffs, as they were under the impression that the Company, being termed "National," had something to do with the State, and had a right to do what they had done. It was only at the beginning of the present year that the plaintiffs became aware of their rights, and the writ in the action was issued on April 13. The facts were that no less than 546 wires in strands or cables passed over the plaintiff's house in Assam-street, Whitechapel. At the back of the house there were two huge poles, which were put into the ground to the depth of over 6 ft., one pole being put there fourteen years ago and one seven years ago. One pole was only about 12 in. from the back wall of the house in question, and the other about 40 in. These poles were subject to oscillation during the wintry weather, and had a pernicious effect on the adjoining property. Three years after the first pole was put there, there appeared a rent in the wall. That rent had been stopped up two or three times, but it had reappeared again, and other mischief had been done. One of the plaintiffs caused a letter to be written to the defendants asking for compensation for the wires passing over the property, but the defendants replied denying liability. Hence the present action.

Mr. J. C. and Mr. G. J. Christoffer gave evidence as to the damage to the walls of the house and the annoyance to the occupiers by the noise of the wires.

Mrs. Barrett, who had lived in the house eleven years, said the crack in the walls appeared after the poles were put there. She had then complained to the landlord as to the nuisance caused by the wires. The wall had given way and a ceiling had come down; also some of the doors were not close.

Mr. Walker Thomas Farthing, architect and surveyor, said that the damage done to the walls of the house, which he estimated at 45*l.*, was caused by the oscillation of the poles.

Mr. Hitchcock, Surveyor and Engineer to the Vestry of St. George's, Southwark, gave similar evidence.

Mr. Roskill, for the defendants, said that he would call evidence to show that the cracks were in the wall fourteen years ago, and were much the same now as they were then.

Mr. L. H. Isaacs, Surveyor to the Holborn District Board of Works, gave evidence to the effect that the poles had nothing to do with the crack in the wall, and that the difficulty as to the doors not closing was due to subsidence.

Mr. W. E. Deane, an architect, said that his opinion was that the cracks were caused by settlement or subsidence.

In the result the Jury awarded the owners of the property 45*l.* and the occupier 5*l.* damages.

Judgment accordingly.

ANCIENT LIGHT DISPUTE IN CLERKENWELL.

THE case of Anobus *v.* Dalton came before Mr. Justice North in the Chancery Division on the 2nd inst., on a motion by the plaintiff for an injunction to restrain the alleged interference with ancient lights at premises in John-street, Clerkenwell.

The plaintiff by notice of motion also asked for a mandatory injunction to compel the defendant to pull down what had been erected. Mr. Henry Terrell, Q.C., for the plaintiff, however, stated that it was arranged the case should go to an independent surveyor, and that his client would waive his claim for a mandatory injunction and substitute one for damages.

It was ultimately arranged that the whole question, together with all the costs, should be referred to a surveyor to be agreed upon between the parties, and in default of their agreeing, that his lordship should nominate a surveyor.

Mr. Micklem, for the defendant, said that the course suggested by his learned friend seemed the right one to pursue.

Order accordingly.

LIGHT AND AIR CASE.

THE case of Barclay *v.* the Wakefield Corporation came before Mr. Justice Romer in the Chancery Division on the 2nd inst., on a motion by the plaintiff to restrain the defendants from interfering with the light and air coming to his premises. There was the usual conflict of evidence, and in the result it was agreed to allow the motion to stand till the trial.

Order accordingly.

ANCIENT LIGHT DISPUTE IN RED LION-STREET, HOLBORN.

THE case of Savage *v.* The Wenlock Brewery Company came before Mr. Justice Romer in the Chancery Division on the 30th ult., it being an action brought by the plaintiff, the lessee of a draper's shop in Red Lion-Street, Holborn, for an injunction to restrain the defendants from obstructing his ancient lights. He also asked for a mandatory order and for damages.

Mr. Neville, Q.C., and Mr. Hamilton appeared as counsel for the plaintiff; and Mr. Levett, Q.C., and Mr. Lawrence for the defendants.

Mr. Hamilton said that the plaintiff had had his shop for over fifteen years, and he claimed to be entitled to ancient lights in respect of four windows and one basement window.

Mr. Levett, in reply to his lordship, did not dispute that the lights in question were ancient.

Mr. Hamilton, continuing, said that on the site of the defendant's building now complained of, there formerly stood a public-house, which was pulled down some three or four months ago. There was very little dispute as to the facts. The width of the street, according to the plaintiff's evidence, between the two buildings was 28 ft. 7 in., the defendant saying it was 29 ft. The height of the defendant's old building was 29 ft. 3 in., which, with a parapet, made it 31 ft. 9 in. The defendants' figures, however, made it 33 ft. high altogether. The defendants' new building was 37 ft. 9 in. high, and with the dormer window it was 44 ft. 9 in. According to the defendants, the height of the building altogether was only 45 ft., so that there was substantially very little difference between the parties as to the measurements.

In the result, his Lordship directed that the case should stand over so that some independent expert, to be named by the President of the Surveyors' Institution, should inspect the buildings and report to him whether there was any substantial interference with the light, and if so, the amount of damages. There would be no order as to costs until he had heard the report of the surveyor. His Lordship also said that the parties must agree to accept the surveyor's report as final.

ARBITRATION CASE UNDER THE WORKMEN'S COMPENSATION ACT.

MR. R. W. PERKS, the Government Arbitrator under the Workmen's Compensation Act, sat, on the 2nd inst., at the Law Institution's Rooms, Leeds, to assess the compensation due under the Act in the case of one Sarah Ann Wood, the widow of John Wood, a painter, lately residing at 7, Mario-place, Beeston-hill, Leeds. The respondents were Messrs. William Walsh & Sons, painters, of Leeds. Mr. Hart, solicitor, appeared for the respondents, and Mr. Arthur Willey appeared for the claimant.

Mr. Willey said that claimant, who was an old employee of Messrs. Walsh & Son, was on September 21 employed on a building in Guildford-street, occupied by Potts & Sons. He was filling in cracks in woodwork and plaster with a mixture of putty, &c., to make a smooth surface, and was also painting. He was actually painting on a ladder, and a rotten rung breaking, he fell to the ground and sustained a fracture of the skull, from which he died almost immediately. Mr. Willey contended that scaffolding was being used on the job, and that his case came within the clause of Section 7 of the Act.

Mr. Hart said his points would be that no scaffolding was being used, that the building was not being repaired (*i.e.*, that painting is not repairing), and that consequently claimant did not come under Section 7 of the Act.

A long argument followed, in the course of which Mr. Willey urged that painting was repairing. Quoting Nuttall's Dictionary, he said, "repair" was defined as "to restore to a sound or good state after decay; to rebuild a part decayed; to make amends or indemnify for a restoration to a sound state; reparation." He added that it could not be believed that the Act contemplated excluding such a case.

Mr. Perks: We know enough of this Act, I think, to know it is a very curious one.

Mr. Willey said he should prove that there was scaffolding being used, but he should suggest that a ladder was scaffolding.

Mr. Perks said he would give a ruling as to scaffolding. A scaffold implied a stage or platform of some sort. A ladder, he held, was not scaffolding.

Mr. Willey then called two of the workmen who were working at Messrs. Potts' premises with deceased. One witness named Stead said he was painting, and had planks tied to his ladder, and run on to a window sill. This, said witness, was a scaffold. He had had more than thirty years' experience as a painter, and such a platform was always called a scaffold, and was, in fact, a scaffold.

Addressing the Arbitrator for the respondents, Mr. Hart, who called no witnesses, said the defence was that there were no repairs being executed; that a ladder was not a scaffold; and that there was no evidence of scaffolding within the meaning of the section. Alternatively, he said, that assuming that there was scaffolding, the deceased was not working on the scaffolding, and was not entitled to come under the Act.

The Arbitrator, in giving judgment, said with regard to the facts, he only had to decide whether there was a board through the ladder and on the window-sill. He found that there was. Was the puttying and plastering repairs within the meaning of the section? He thought not. With regard to the scaffolding, he thought also that something more substantial was contemplated by the Act. He found for the respondent with costs.

Mr. Willey asked the Arbitrator to state a case for the County-court Judge. Mr. Perks promised to do so.

THE WORKMEN'S COMPENSATION ACT.

AT the Southwark County-court, on the 5th inst., Ernest Ewington, a bricklayer's labourer, claimed compensation from Mr. Goodall, builder, of Stoke Newington, in respect of injuries plaintiff had sustained whilst at work at a building in Magdalen-street, Bermondsey. Mr. O'Connor was counsel for the applicant, and Mr. Mallinson represented the respondent.

Mr. O'Connor said that on October 28 the applicant was at work at the building for a sub-contractor to respondent, named Ward. Whilst holding two hods to be filled, a large piece of wood fell on his head, causing a severe scalp wound, shock to the system, and defective sight. Applicant had not yet recovered sufficiently to go to work. The defence would be that the building was not 30 ft. in height when the accident happened.

His Honour: The very first case I tried under this Act depended on that point. The applicant's advisers argued that although the building was not 30 ft. where the accident occurred, yet it was intended to be raised to 60 ft. After a long argument I was compelled to find that the building must have reached 30 ft. at the time of the occurrence to enable an injured workman to recover under the Act, and the Court of Appeal upheld that.

Mr. O'Connor: You will find a new point in this case, which is as to where the building is measured from, whether from the base of the foundations or the basement level.

The defendant's evidence and the plans put in showed that the building at the time of the accident was 26 ft. from the basement level, and 35 ft. 6 in. from the base of the foundations,

Mr. O'Connor: I submit that this building was more than 30 ft. high within the meaning of the Act.

His Honour: The foundations can't be included, because they are excluded by the words of the Act. According to you, Mr. O'Connor, if a building was only 5 ft. high and the foundations 25 ft., your client would be entitled to compensation.

Mr. O'Connor: The foundations have to be built, and they are part of the height of the building.

His Honour: I hold that the Act does not mean the foundations to be taken into account in reckoning the height of a building. It is to be reckoned from the basement level. I therefore find for the respondent on the ground that the building was not 30 ft. high. I wish to add that it is amazing to my mind that people should have put into this Act anything so mischievous as this appeal clause. Here is a case in which a man has been injured. He has been out of work in consequence five weeks, and, under the Act, if he were entitled to anything at all, I should have to first of all take off two weeks of the five for which I could give him nothing, and then for the other three weeks all I could award him would be 45s. for the three weeks, which is half his ordinary wages. I certainly could give a few shillings more for the time he will be incapacitated, but I cannot give anything for pain or suffering, or doctors' bills. And yet this Act allows me to send this case, involving a few shillings, to an arbitrator, whose fee alone would be 4*l.* 4s., and he could refer it back to me on this point of law, and then, when I had settled that, by the extraordinary way in which the Bill was allowed to be amended in Parliament, either party can go to the Court of Appeal. I have some feeling in this matter, because I do my utmost to keep the expenses of the Court down, whilst this Act allows such oppression, not only of the poor but the rich too, by allowing persons the luxury of going to the Court of Appeal, where such a small amount is involved.

Mr. Mallinson: I was in the first case that was heard before the Court of Appeal, and in that half a dozen statutes had to be gone through in order to find out if the applicant was entitled to compensation.

Judgment was entered for the respondent, but no costs were asked for, and Mr. Mallinson intimated that his client was willing to give the man work.

ACTION ON A BUILDING CONTRACT AT MANCHESTER.

AT the Manchester Winter Assizes, on the 21st ult., in the Crown Court, the case of Mellor v. Grain came before Mr. Justice Phillimore and a common jury. Mr. Woodroofe Fletcher and Mr. Pilkington Turner appeared for the plaintiff, and Mr. Bradbury and Mr. M'Keever for the defendant.

Mr. Fletcher said the plaintiff was Mr. Alfred Mellor, builder and contractor, Openshaw, and the defendant was Mr. Edward Grain, locomotive engine driver, Openshaw. The claim was for 116*l.* 8s. 4d., the balance due under a contract for the building of four houses in Sandiwell-street, Openshaw. With regard to the main part of the claim the defendant said that the plaintiff had not done the work in accordance with the specifications and the by-laws of the Manchester Corporation, and he counter-claimed for the expense he said he would be put to in making the work good. The defendant had, after a lapse of two years, enumerated a large number of cases in which he said the specifications had not been fulfilled, and three in which the Corporation by-laws had not been complied with, but even assuming that these allegations were well founded, the plaintiff contended that the defects were of such a trivial character that an expenditure of 15*l.* would set everything right.

Mr. Alfred Mellor, builder, Fairfield, the plaintiff, in the course of his evidence said that the specifications and by-laws were carried out, except where he deviated from the plans at the defendant's request. Everything necessary could be done for 7*l.* 10s. In cross-examination the plaintiff said the party-walls were not carried up to the slates, as they should have been. The houses in question were built up to some other houses which belonged to the defendant. The gable wall of the old houses was a 4½ in. wall, and although on the plan for the new houses a 9 in. wall was shown, he did not build a new wall up to the old 4½ in. wall. He saw the plans before they were sent in.

Mr. C. H. Mellor, architect and surveyor, Manchester, a former clerk to the Openshaw Local Board and Chairman of its Building Committee, said he drew up the specifications and the plans. They were approved of by the defendant and passed by the Corporation. In cross-examination, the witness said the contractor's price would include the making of the 4½ in. wall into a 9 in. wall. The work could have been done at first for 10*l.* or 12*l.*, but it would now have to remain a defect. The Manchester by-laws required a party-wall to be carried up to the roof.

Mr. W. H. Aldred, architect and surveyor, formerly in the service of the Manchester Corporation as an inspector of property, said the work which was the subject of this dispute was generally satisfactory. In several cases where fireplaces already existed the Corporation had allowed old walls to remain at 4½ in. Apart from this question of the walls, 15*l.* or 16*l.* would cover the defect.—Cross-examined by Mr. M'Keever, the witness said that in some cases a 4½ in. existing wall had been passed by the Committee, but since the new by-laws came into operation a 4½ in. partition wall between new houses had never been allowed.

Other witnesses having been examined,

Mr. M'Keever, on behalf of the defendant, called a number of witnesses to show the cost to which his client would be put in making the property what it ought to be.

Mr. Hibbert, builder, Moss Side, estimated the amount at 120*l.*

Mr. M'Farlane, another builder, considered that it would be impossible to make the houses all right.

Mr. E. J. Thompson, architect and surveyor, Dickinson-street, Manchester, said the cost of the necessary alterations would be 122*l.*, and the property, the contract price for which was 792*l.*, exclusive of some extras, would not bring more than 700*l.*

The Judge, in summing up, said the suggestion made on behalf of the plaintiff was to the effect that he undertook if he could to run this matter through without the Corporation opposing—that if the Corporation insisted the contractor would put up the required wall. This was a very discreditable story, if it was true, to both the Messrs. Mellor, and it was also discreditable that the Corporation officers never detected it. It was put forward by the Mellors, in fact, that it was the duty of the Corporation's inspectors to see that they put up a 9 in. wall, and that if the inspectors did not come down upon them they were entitled to avoid doing so. One of the defendant's witnesses said there were times when a deviation was allowed, but here nothing of the kind had been done. The plan was sent in with a 9 in. wall, and this seemed to show great carelessness on the part of the Corporation and great blame on the part of the plaintiff. He thought the jury ought to allow damages in respect to this gable wall, and that something must come off for not building the three party walls up to the roof.

The jury, after a short consultation, returned a verdict for the plaintiff for 66*l.* 8s. 4d.—practically, as the Judge remarked, knocking off 50*l.* in respect of the counter-claim.—*Manchester Guardian.*

THE WORKMEN'S COMPENSATION ACT.

THOMAS MELLOR, a bricklayer, applied to his Honour Judge Shand at Liverpool County Court on the 25th ult. for an arbitration under the Workmen's Compensation Act. Mr. Segar, instructed by Mr. Lynskey, appeared for the applicant, and Mr. J. H. Kenion for Messrs. James Tomkinson & Co., contractors, Roscommon-street, the defendants.

The facts, as stated by Mr. Segar, were that the plaintiff, who is thirty-five years of age, was employed by defendants in the erection of a new warehouse, Vauxhall-road, at a wage of £1 19s. 8½d. per week. On August 16 last he was engaged trimming a blue brick when a piece of the brick struck him in the left eye, injuring it so badly that it had to be removed. The sight of the other eye was affected, and he had not since been able to resume his employment. The claim was based on the 7th section of the Act, which is as follows:—"This Act shall apply only to employment by the undertakers as hereinafter defined, or in or about a railway, factory, mine, quarry, or engineering work; and to employment by the undertakers as hereinafter defined, in or about any building which exceeds 30 ft. in height, and is either being constructed or rebuilt by means of a scaffolding, or being demolished, or on which machinery driven by steam power or other mechanical power is being used for the purpose of construction, repair, or demolition thereof." He admitted that in this case, the wall not having reached the height of 30 ft., he could not claim under that part of the clause; but as there was a large derrick in use on the works at the time, he submitted that the case came within "engineering work," which was defined in a sub-section of Section 7 as follows:—"Engineering work means any work of construction or alteration or repair of railroad, harbour, dock, canal, or sewer, and includes any other work for the construction, alteration, or repair, of which machinery driven by steam, water, or other mechanical power is used."

Mr. Kenion submitted that work of the nature involved in this case was clearly out of the purview of the Act; that it was the case of an ordinary building, the walls of which had not reached the height of 30 ft.; that a derrick could not be classed as machinery in the ordinary sense, or in the sense intended by the Act, and that therefore plaintiff could not recover.

According to the medical evidence the plaintiff was now able to work again, though he could not be as good a workman as before.

His Honour was of opinion that as far as the question of law was concerned the work this man was engaged in came under the head of engineering

work, as defined by the 7th section and sub-section, because it was a work of construction in which mechanical power was employed. Therefore he held that the plaintiff was entitled to compensation, and he awarded him 50 per cent. of his earnings, or 19s. 10d. a week from August 30 to November 26, and 7s. 6d. a week during partial disablement.—*Liverpool Mercury.*

MEETINGS.

FRIDAY, DECEMBER 9.

Royal Institute of British Architects. — Annual Dinner, to be held at 7.30 p.m., in connexion with the Birmingham Architectural Association, at the Grand Hotel, Birmingham. The President, Professor Aitchison, R.A., will hold a reception at the Rooms of the Society of Artists between 5 and 6 p.m., and a short business meeting will be held immediately afterwards, and before the dinner.

Architectural Association.—Mr. Edwin T. Hall on "The Position of Architecture among the Fine Arts." 7.30 p.m.

Institution of Junior Engineers (Westminster Palace Hotel, Victoria-street).—Mr. E. A. Heath on "British Cable Tramways, and their Construction." 8 p.m.

SATURDAY, DECEMBER 10.

British Institute of Certified Carpenters.—Visit to the Charterhouse, 3.30 p.m. Annual Meeting at Carpenters' Hall at 6 p.m.

MONDAY, DECEMBER 12.

Surveyors' Institution.—Mr. W. Weaver on "The London Building Act and the Official Supervision of Buildings." 8 p.m.

Society of Arts (Cantor Lectures).—Professor Vivian B. Lewes on "Acetylene." IV. 8 p.m.

TUESDAY, DECEMBER 13.

Institution of Civil Engineers.—Paper to be discussed: "The Ventilation of Tunnels and Buildings," by Mr. F. Fox. 8 p.m.

Sheffield Society of Architects and Surveyors.—Mr. Beresford Pite on "Michelangelo's Architecture." 8 p.m.

WEDNESDAY, DECEMBER 14.

Society of Arts.—Sir Albert Rollit on "Commercial Education." 8 p.m.

Edinburgh Architectural Association.—Mr. E. Forbes on "The School of Applied Art Studentship: a Sketch of the Work in Galloway." 8 p.m.

Edinburgh Architectural Society.—Mr. G. Balfour on "Electric Lighting." 8 p.m.

Liverpool Engineering Society.—Professor H. S. Hele-Shaw on "Further Experiments on the Character of Fluid Motion." 8 p.m.

Northern Architectural Association.—Mr. G. E. R. McAdam, of Berwick, on "The Effects of Frost and Heat on Plumbing Work." 7.30 p.m.

THURSDAY, DECEMBER 15.

Society of Antiquaries.—8.30 p.m.

Institution of Electrical Engineers.—8 p.m.

FRIDAY, DECEMBER 16.

Architectural Association: Discussion Section.—Mr. S. W. Cranfield on "Buildings for Secondary and Technical Education." 7 p.m.

Institution of Civil Engineers (Students' Meeting).—Mr. Walter Daniel on "The Kentish Town Widening, Midland Railway." 8 p.m.

Glasgow and West of Scotland Technical College: Architectural Craftsman's Society.—(1) Mr. W. H. Baxter on "Shoring and Slapping." (2) Mr. John Bowman on "Difficulties with Foundations." 8 p.m.

SATURDAY, DECEMBER 17.

Sanitary Inspectors' Association.—(1) General Meeting at 6 p.m., when a Paper will be read by Mr. W. H. Grigg. (2) An Extraordinary General Meeting at 8 p.m., when the following resolution will be submitted on behalf of the Council:—"That the number of members in the Association shall be increased by the addition thereto of seven hundred (700) members beyond the present registered number."

RECENT PATENTS:

ABSTRACTS OF ACCEPTED SPECIFICATIONS.

Open to opposition until January 16.

[1897]. 25,709.—VENTILATORS FOR DRAINS AND SEWER PIPES: *S. C. Shewell & W. R. Clark.*—The invention consists of a metal case having a movable back deeply recessed into the case. The upper portion of the recessed part contains a horizontal valve; the case's lower part is connected to the drain pipe by a pipe: an inrush of air into the drains lifts the valve and passes into the case, then down the drain pipe. Foul air cannot escape on account of the closing of the valve.

26,002.—FURNACES FOR THE DESTRUCTION OF TOWN REFUSE: *G. Watson.*—For an improvement in the method of introducing the charge, without affording an outlet for smoke for any undue length of time, is devised a furnace having a deck for bringing the refuse thereto in waggons or carts, with a deck-house having suitable openings and means for drawing air through the deck-house to prevent effluvia from escaping. Between each pair of back-to-back furnaces is a large feeding hole, common to both, extending downwards from the top or deck, and so arranged that the refuse falls either on to the fires or into such a position that it may be easily dragged forward on to the fire. The feeding hole also forms a storage for refuse within the furnace.

26,530.—APPARATUS FOR HEATING BUILDINGS, &c., BY MEANS OF HOT FLUIDS OR ELECTRICITY: *J. A. Dargue, E. Griffiths, & C. H. Wright.*—To admit of the faces of the radiator, set of coils, coil cases, or batteries, being continually kept clean, and to provide ventilation when the heating surfaces are inside a case, a receiving plate for the dirt is formed near the bottom of the radiator. It can either slide in or out, or work upon an axis, and can be made to tip the dirt into a settling place or be fitted with a scraping device.

26,886.—INSPECTION AND SIMILAR CHAMBERS FOR DRAINS: *The Albion Clay Company and A. W. Bird.*—The chamber comprise a bottom having a sewage outlet, and an upper part having one sewage inlet, or more, jointed to the bottom part so that the relative angular positions of all the parts may be varied, the uppermost part having a square top. The parts are mounted upon one another by flange and socket or joints, so that they can be turned or angularly displaced, and as the outlet from the gully is formed on the bottom part, and the connexions for the inlet drain pipe or pipes are in the piece or pieces mounted upon it, the connexions can, by rotating or displacing the pieces, be brought into any desired position without disturbing the position of the outlet. The invention is equally applicable to receptacles into which drain-pipes enter.

29,250.—CONNECTING OR COUPLING WATER PIPES, &c.: *H. Saunderson & J. Barker.*—The inventors employ two collars, with projections, and with taper holes tnsough the collars and projections, to take the pipe's ends, the collars being also provided with holes to take threaded bolts, a ferrule, with both its ends tapered, is placed within the two ends of the pipe. In making the connexion, the two collars are placed on the two ends of the pipe, whose ends are enlarged to fit the taper holes in the projections on the collars, and the ferrule is placed with its ends in the two enlarged ends of the pipe, and the collars are then tightened up by means of the threaded bolts. For angle joints, a collar having two ferrules in one T-shaped casting or piece may be used, one ferrule projecting out of one side of the collar having one taper end, and the other ferrule being an elongated one connected to a neck projecting from the collar's other side.

29,254.—MEASURING VERTICAL AND HORIZONTAL ANGLES FOR NAUTICAL, SURVEYING, AND OTHER PURPOSES: *E. N. Sennett.*—A semi-circular base has its edge suitably graduated, at a point over the centre from which is struck the arc of the base is pivotted one end of a flat arc whose lower end can travel along a platform a little above the base's edge, the flat arc is graduated, and slotted fron near one end to near the other end for a runner carrying a pointer or pointers for indicating the angle on the flat arc; to the runner is attached an end of a telescope turning vertically on pivots supported above the base-arc's centre; an arm extending to the edge is pivotted to the base's centre and moves between it and the platform on which travels the vertical arc's lower end, the arm's outer end is fitted with a vernier and a magnifying glass, vertically over the centre and attached to the arm is the index glass with its reflecting surface towards the base's edge; at one end of the base's diameter is a telescope whose axis points to the base's centre, and cutting the axis is the horizon glass attached to the base, the reflecting half of the glass being towards the index glass's reflecting face: the horizon glass is parallel to the index arm when the latter is at zero.

29,348.—PACKER FOR WHITE LEAD, COLOURS, CLAYS, AND OTHER DRY MATERIALS: *R. A. Young.*—The novelty lies in contriving that the shaft, with rammer attached, shall be lifted at each stroke the entire length of the throw of the cam, and shall always begin its rise from the position it has taken upon the material beneath.

29,352.—VENTILATING HOUSES, SHOPS, &c.: *H. Green.*—Holes in a perforated grid which is fixed in the ceiling communicate with the underdrawing or space above, above the grid is a closed passage or conduit (which may be composed of two of the floor beams) communicating with an outside tube, or proceeding upwards directly to the highest point in the roof, or discharging into a hopper on the roof.

30,869.—VENTILATION OF BUILDINGS: *S. M. Rutnagur.* The invention consists of a double casement with an intervening space, the windows of the two sections may be hinged, or may slide in grooves; when the lower windows of the outer casement and the higher windows of the inner casement are opened the amount of entering air may be regulated and its velocity diminished by making the openings in the outer casements not so large as the openings in the inner casement—thus direct draught is prevented, and in fine weather all the windows may be opened; the contrivance may also be applied to doors, gates, or ventilating panels.

30,928.—PARQUET FLOORING: *E. Queitzsch.*—The claim is for a parquet flooring wherein the various panels are cut at certain angles to the direction of the fibres of the wood, in such a manner that the strains arising from pressure, tension, or bending, may be reduced or mutually balanced, so as to ensure durability and economy. To avoid a short length of grain at the two opposite corners of the panels, which might be carelessly broken off, may be inserted a hard wood block in the middle, where four panels abut.

[1898.]—102.—FIRE-PROOF DOORS: *J. H. McGrouther.*—To prevent the door from buckling or warping under the influence of heat, it is constructed of a built-up framework, having sufficient lateral strength to give the necessary support, with panel spaces for the fitting therein of loose plates with sufficient clearance to let them expand under the influence of heat.

119.—VARNISH, SPECIALLY APPLICABLE FOR GIVING A FROSTED APPEARANCE TO GLASS, TALC, &c.: *Blundell, Spence, & Co., and S. Hill.*—For a varnish that, though clear and transparent when applied, shall become semi-opaque or crystalline on drying, and when applied to glass, talc, or other transparent material, and for covering or varnishing paint to the same end. The inventors use a pale varnish, say three parts, in which are dissolved resinates and stearates of lime, lead, and manganese, adding thereto tung oil, say one part, with a small quantity of essential oil, in order to increase the solubility of the stearates.

1,813.—WINDOW FRAMES AND THEIR SASHES: *J. Craig.*—That the sashes may be folded to the inside, each of the pulley stiles is rebated along its inside to form a check or stop for the bottom sash, as the parting beads are checked back to the flush of the face of the stiles at the outside from the centre of the meeting rail downwards, thus the top sash, when lowered to the bottom, can be folded inwards. To enable the bottom sash to fold likewise, the inside beads are cut at a point a little above the meeting-rail, the top parts are securely fixed, and the bottom parts may be hinged or secured with pinching screws. Four small grooved wheels are secured to the stiles, one on each parting bead in the centre of the rails, and one at each point where the inside beads are cut, the wheels serving as guide pulleys for the sash cords.

14,370.—WOODEN FLOORING AND PAVING: *Mark Fawcett & Co.*—In the opposite corners of each rectangular block are formed grooves cut at an angle of 45 deg. to the block's side or end, and in putting the blocks together continuous wooden or metal tongues, laths, or strips are engaged in the grooves. The grooves may be cut halfway into the depth of the blocks, in which case the blocks can be inverted, or the grooves may be nearer the under-sides, so as to leave more wood above for wear.

17,408.—WOOD BLOCKS, STAVES, OR PIECES FOR USE IN PARQUETRY AND OTHER FLOORING, AND MACHINERY FOR USE IN THEIR MANUFACTURE: *E. Zappert.*—The blocks are fashioned with dove-tailed or similar grooves across their lower surface, for receiving correspondingly-shaped strips of wood. The machinery comprises two cutter-shafts arranged at an angle to one another, and mounted the one behind the other, and bearing bevelled or similar cutters or saws, which can be adjusted in position as may be desired.

18,990.—SELF-LOCKING FLOORING BLOCKS, TILES, &c.: *A. J. B. Ward.*—The inventor makes two differently shaped blocks, one with a bulge on the top and left-hand side and a hollow on the bottom and right-hand side, the other with a bulge on the top and right-hand side and a hollow or splay on the bottom and left-hand side; the blocks may also be grooved, and the tiles may be made with knobs on top or bottom; thus the blocks can be keyed with practically no waste of material, and metal or wood dowels are dispensed with.

19,939.—ELECTRICAL METERS: *C. D. Haskins.*—The improvements consist of (1) the combination of an armature in shunt to the mains and field coils in series with the load, with a starting coil also in series with the armature and in shunt to the mains, and means for changing the current flow in the starting coil without affecting that in the armature circuits; (2) the combination of a field coil in series with the work, an armature wherein a sensibly constant current is to be maintained, connected across the mains, a starting coil in series with the armature and with an auxiliary high resistance, two resistances, one in series with the coil, the other in shunt thereto; and (3) calibrating a meter by changing the current flow in the starting coil to compensate for local errors without changing the current flow in the armature circuit.

20,322.—DOOR OR WINDOW HINGE WITH LUBRICATING CHAMBER: *C. Haferkorn.*—The oiling occurs whenever the door or window is opened or closed; the hinge pin is depressed whenever the door or window is opened, by means of wedge-shaped recesses or notches acted upon by a pin in order to uncover for a short interval the opening of the lubricating reservoir, the piston of the last-named is displaced—when the door is moved—by the action of a slotted guide in such a manner that the lubricant is fed against the frictional surfaces of the hinge; when the door is turned, openings in the bottom of the reservoir coincide with the oil ducts or grooves of the hinged pin.

NEW APPLICATIONS.

November 21-6.

24,491, Keeble & Innes, Making Cambridge Portland Cement from Chalk and Marl. 24,493, J. H. Exley, 24,501, W. Ellen, 24,597, A. W. Sanderson, 24,623, Newman & Critchley, 24,682, O. Falbe, 24,704, R. W. Spittlehouse, 24,785, Bailey & Nicklin, 24,862, Dickson & Wallace, 24,953, L. Morris, 24,975, E. L. Levetus, and 25,016, A. Schwass, Acetylene Gas Generators. 24,503, E. Finch, Purification of Town Sewage. 24,504, W. M. Simpson, Gas Stoves. 24,519, Rockhills, Hot Air Stove Settings. 24,530, C. T. J. Oppermann, Electrical Accumulators. 24,535, Shellhammer & Garner, Tool Holders. 24,549, B. Humayer, Mosaic Pictures. 24,556, A. Skeffington and Others, Smoke Consuming Furnaces. 24,557, R. Pringle, For increasing the Heating Efficiency of Flames produced by the Combustion of Gaseous or other Fuel. 24,566, G. C. Fricker, Opening and Closing Electrical Circuits. 24,582, J. Willoughby, Refuse Destructors. 24,590, J. Simpson, Bath Discharge Valves. 24,592, G. B. Thornton, "Door-silencer." 24,603, Mason & Wilson, Brick, Pottery, and other Kilns. 24,604, W. Holmes, Automatical Flush Cleat. 24,608, Jefferys, Road-gradient Indicator. 24,611, W. H. Bomm, Rope Clamp. 24,613, J. R. Bell, Grab Dredgers. 24,627, S. Bandrowski, Artificial Fuel. 24,629-30, D. W. Peck, Artificial Asphalt. 24,645, Benville & Muriaty, Polishing Compounds. 24,652, H. Aylmer, Miners' Drills. 24,657, A. Wachtl, Vices. 24,661, J. Brockie, Turning Lathes. 24,674, E. P. Bainbridge, Cabinets, Desks, and General Furniture. 24,680, E. Burrows, Boring Bits. 24,683, N. Shaw, Drying Sand and Loam Moulds used in Dry Sand Castings. 24,694, W. P. Ellmore, Regulating the Flame in Stoves or Lamps for Lighting or Heating Purposes. 24,696, T. G. Macfie, Acetylene Safety Miner's Lamp. 24,698, Sarah A. Hazlewood, Stoves or Ranges. 24,705, T. W. Twyford, Emptying Lavatories, Wash-basins, Baths, Sinks, and Urinals. 24,709, Oxley & Williamson, Chimney Pots for Preventing Down Draughts. 24,722, J. B. Hamilton, Sewer and Drain Pipe Joints. 24,727, W. A. Price, Electricity Measures. 24,730, J. W. Bowley, Fire Grates and Heating Stoves, &c. 24,761, Bayldon & Armstrong, Instrument for Facilitating Trigonometrical Admeasurements with other Calculations. 24,762, G. Campanato, Decorating Articles of Wood, Metal, Stone, Glass, &c. 24,763, Phillips & Pring, Roller Mills suitable for Grinding Mortar, Clay, &c. 24,771, F. W. Lanchester, Gas Generators. 24,772, H. Salsbury, Carbide Holders and Accessories. 24,782, W. Oates, Sanitary Mangers for Horses and Cattle. 24,783, Jacks, 24,881, J. Webster, and 24,894, R. H. Dunn, Window Cleaning and Similar Devices. 24,786, G. D. Innes, Casting the Buffer Holes in the Metal Pedestals of Water-closets. 24,788-9, R. W. McDonald, Lavatories and Two-piece Closets. 24,790, E. J. Barker, Window Sash Suspender and Cord or Line Holder. 24,792, S. H. Brierley, Syphon Cistern and Water Waste Preventer. 24,800, H. Davies, Window and Similar Sash Fasteners. 24,812, R. E. B. Crompton, Electrical Meters. 24,813, G. W. Mitchell, Automatical Weather Strip for the Bottom of Doors. 24,822, H. Callow, Sliding Window Sashes and Frames. 24,858, B. J. B. Roberts, Burglar Alarms. 24,861, W. A. Webster, Circular Saw Guards. 24,866, C. Janssen, Boring Oval Holes in a Single Operation. 24,689, W. Kerridge, Copper Furnaces, Doors, Grates, or Flues. 24,902, Bändel & Klinik, Catch Apparatus for Hoists. 24,912, C. S. Bradford, Lamp, Gas, and Electrical Fittings, &c. 24,919, J. H. Dierickx, Closing Devices, such as Doors, Shutters, &c. 24,921, H. Sheaf, to facilitate Drawing from Models, &c. 24,926, G. Weber, Hinges. 24,928, G. Austin, Brick Making Machines. 24,932, Nevin & Bulfield, Distempering and Painting Compositions. 24,936, G. P. W. Richards, Soldering Iron. 24,936, C. H. Martini, Closets, Urinals, and similar Sanitary Arrangements. 24,940, T. E. Hewitt, Locking and Unlocking Emergency Exit Doors. 24,941, O. Howl, Drying Bricks, &c. 24,946, H. O. Foersterling, Optical Projection Apparatus. 24,950, W. Nicholson, Pivots for Swinging-sashes in Frame Windows. 24,957, Woodward & Collier, Settling, Cutting-off, Scratching, and Finishing-off Sanitary Pipes, &c., when a Plastic or Semi-dry State. 24,965, Hanchett & Sage, Electrical Resistance Measuring Instrument. 24,973, A. Hackwray, Safety Hand and Tool Tipping Rest for Grindstones. 24,994, W. Mallett and Others, Optical Appliances Applicable as View-finders or for Other Purposes. 25,000 C. G. Gsell Purifying Waste Water or

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITIONS.

Nature of Work.	By whom Advertised	Premiums.	Designs to be delivered.
Central Library, Albion-st.	Hull Corp.	50*l.*; 30*l.*; 20*l.*	Jan. 1
Pump Room, &c.	Harrogate Corp.	do.	Jan. 2
School, &c. Ormerod-rd.	Burnley Sch. Bd.	Not stated (Local Competition)	Jan. 14
*Three Schools	Dartford S.B.	30 and 10 guineas	Feb. 10

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c. Supplied by	Tenders to be delivered.
*Road-making, Sewers, Drains, Fencing, &c.	Willesden D.C.	O. Claude Robson, Public Offices, Dyne-rd. Kilburn	Dec. 13
*Public Baths, Plaistow	Cty. Boro. of West Ham	A. Saxon Snell, 22, Southampton-bldgs. W.C.	do.
*Kerbing, Tar Paving, Channelling, &c.	Lewisham B. of W.	Surveyor's Dept. Board's Offices, Catford, S.E.	do.
Fireclay Goods	Heywood (Lancs.) Corp.	W. Whatmough, Municipal Buildings	do.
Stoneware and Other Sewers, Shoreham Harbour	Steyning East & West R.D.C.	C. O. Blaber, C.E. 64, Ship-street, Brighton	do.
Sewage Pumping Station, Frankland-lane	Durham Corp.	Lomax & Lomax, C.E. 37, Cross-st. Manchester	do.
Main Drainage Works	Tunstall (Staffs.) U.D.C.	do.	do.
Timber, Cement, &c. Stockton-on-Tees	Tees Conservancy Commissioners	J. H. Amos, Board Room, Stockton-on-Tees	do.
Pair Cottages, Woking Park Farm	Woking U.D.C.	G. J. Wooldridge, Surv. Bank-chmbrs. Woking	do.
*Cast Iron Dust Shoots	Corp. London (City Land's Com.)	City Surveyor, Guildhall	Dec. 14
Road Metal, Cement, &c.	Dublin Port & Docks Board	N. Proud, Docks Office, Dublin	do.
Drain Pipes, Bricks, &c.	Macclesfield Corp.	Boro Engr. Town Hall	do.
Pipe Sewer, &c.	Mansfield T.C.	E. F. Vallance, C.E. Boro Surv.	do.
Refuse Destructor	Haslingden (Lancs.) T.C.	Surveyor, Town Hall	do.
Levelling, Paving, &c. Back Roads	Preston (Lancs.) Corp.	Boro Surv. Town Hall	Dec. 15
Rebuilding King's Head Hotel, Tynewydd, Glam.	E. E. Bevan	J. C. Rees, Archt. St. Thomas'-chmbrs. Neath	Dec. 17
Bridge Ironwork and Construction	Galway County Authorities	J. Perry, C.E. County Surv. Galway	do.
*Joiners, Plumbers, Plasterers, Slaters and Glaziers' Work at Hotel, Edinburgh	Caledonian Ry. Co.	Pieddie & Washington Browne, 8, Albyn-place, Edinburgh	do.
*Sewering, Levelling, Paving, Making-good, &c. Roads	Hornsey U.D.C.	E. J. Lovedrove, Offices, Southwood-lane, Highgate, N.	Dec. 19
*Granite and Concrete Flags	Walthamstow U.D.C.	G. W. Holmes, Town Hall, Walthamstow	do.

CONTRACTS—*Continued.*

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c. Supplied by	Tenders to be delivered.
Extension of Victoria Station, Manchester (Contract No. 1)	L. & Y. Ry. Co.	C. W. Rayley, Hunt's Bank, Manchester	Dec. 20
*Infants School	Edmonton S.B.	H. W. Dobb, 110, London-wall, E.C.	do.
*Sewering Roads	Frimley U.D.C.	Surveyor's Office, High-st. Camberley	do.
*Kerbing, Channelling, and Paving	Tottenham U.D.C.	P. E. Murphy, 712, High-road, Tottenham	do.
Sewerage Works, &c. Lord-street and others	Blackpool Corp.	J. Wolstenholme, C.E. St. John's Markt-buildings	Dec. 21
*Additions, &c. to Asylum at Burghill	Hereford Cnty. Asylum	Giles, Gough & Trollope, 28, Craven-street, W.C.	Dec. 28
*Works and Materials (various)	St. George's, Hanover-square, Vestry	G. Livingstone, 1, Pimlico-road, S.W.	Dec. 31
Sewer (1,300 yards)	Taunton T.C.	J. H. Smith, C.E. Boro. Surv.	Jan. 1
*Superstructure of Workhouse	Nottingham Guardians	A. Marshall, King-street, Nottingham	Jan. 3
*Enlarging Hospital, Plaistow	Cty. Boro. of West Ham	E. T. Hall, 57, Moorgate-street, E.C.	Jan. 7
*Infirmary and Administrative Block at Workhouse	Horsham Union	C. H. Burstow, 6, West-st. Horsham	Jan. 9
*Concrete Foundations, Brick, Steel, and Concrete Superstructures, Wards, Boiler House, Chimney Shaft, &c. at Asylum	County of Southampton	W. J. Taylor, County Sur. The Castle, Winchester	Jan. 16
*Sewerage, Drainage and Road-making	Abbots Barton Bldg. Estate	H. J. Weston, 24, Portland-st. Southampton	No date
*Synagogue		F. W. Woolf, 23, Charles-st. Stepney, E.	do.
Timber, Sunderland	River Wear Commrs.	C. H. Dodds, Dock Offices, Sunderland	do.
Railway Sidings, &c. nr. Hook Norton, Wrexham	Brymbo Steel Co.	Secretary Co.'s Offices, near Wrexham	do.
Well Boring, Grantham		J. Brailey, Avenue-road, Grantham	do.
*Electric Lighting Station	Buxton U.D.C.	W. R. Bryden, 1, George-street, Buxton	do.
*School Furniture	Sch. Bd. for London	The Clerk, Offices, Victoria Embankment, W.C.	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in.
*Clerk	Harrow-on-the-Hill U.D.C.	160*l.* rising to 200*l.*	Dec. 16
*Assistant to Manual Training Instructor	S. B for London	120*l.* rising to 175*l.*	Dec. 17
*Instructor for Technical School	Lagos Government (W. Coast of Africa)	300*l.* per an. free quarters, passage paid	Dec. 29

Those marked with an asterisk (*) are advertised in this Number. *Competition*, p. iv. *Contracts*, pp. iv. vi. viii. & xix. *Public Appointments*, pp. xvii. & xix.

Sewage by Precipitation. 25,005, H. Herberg, Instruments for Use by Draughtsmen and Others. 25,007, P. Küpper, Mixing and Kneading Machines. 25,009, C. Vernier, Electrical Arc Lamps. 25,013, A. Vosmaer, Electrical Arc Lighting. 25,021, J. W. Claughton, Securing and Strengthening the Bases of Cisterns, &c.

SOME RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

November 15.—By W. DEW & SON (at Conway).

Llysfaen, Carnarvon.—Enclosures of land, 3 a. 3 r. 26 p., f. £340
A small holding, 9 a. 1 r. 18 p., f. 540
Three houses with outbuildings, and 50 a. 2 r. 38 p., f. 1,530

November 17.—By TROUGHTON THOMPSON (at Kirkby Lonsdale).

Whittington, Lancs.—The Sellett Hall Estate, 110 a. 3 r. 37 p., f. 4,600

November 18.—By WYATT & SON (at Chichester).

Chichester, Sussex.—48, York-pl., f. 155
13, Cavendish-st., f. 120

By A. J. SHEFFIED.

Poplar.—50 and 52, Ida-st., and 45, Willis-st., u.t. 27 yrs., g.r. 2*l.* 15s. 230
Forest Gate.—27, Stork-rd., u.t. 80 yrs., g.r. 5*l.* 5s. 145
Victoria Docks.—2 to 16 (even), Royal-rd., u.t. 82 yrs., g.r. 24*l.* 890
2 to 16 (even), Alnwick-rd., u.t. 82 yrs., g.r. 24*l.* 880
Canning Town.—1, Ford-st., u.t. 990 yrs., g.r. 5*l.* 5s. 165

By SALES & CLARKE.

Plumstead, Kent.—14 and 16, Ingledew-rd., u.t. 68 yrs., g.r. 7*l.* 10s. 410
18 to 26 (even), Ingledew-rd., u.t. 80 yrs., g.r. 20*l.* 1,040
32, 34, 36, 38, 40, and 48, Coxwell-rd., u.t. 58 yrs., g.r. 21*l.* 1,290
28, Liffler-rd., u.t. 64 yrs., g.r. 3*l.* 10s. 205
Barking.—62 to 76 (even), St. Mary's-rd., f. 1,500

November 19.—By W. J. REES (at Carmarthen).

St. Peter's, Carmarthen.—Pentrehydd Farm, 125 a. 2 r. 34 p. 4,900

November 21.—By Messrs. CRAWTER.

Cheshunt, Herts.—Lordship-rd., Pengelly House, f., e.r. 80*l.* 1,050

By CLIMPSON & JOHNSON.

Balham.—8, Verran-rd., u.t. 76 yrs., g.r. 6*l.* 10s., r. 26*l.* 170

By FORTESCUE & BRANSON.

Fulham.—19, Humbolt-rd., f., e.r. 50*l.* 540
Shepherd's Bush.—35, Gayford-rd., f. 345

November 22.—By F. J. BISLEY & SONS.

Catford.—122, 124, and 126, Catford-hill, u.t. 80½ yrs., g.r. 15*l.* 660

By DEBENHAM, TEWSON, & CO.

Aldersgate-st.—14, Bartholomew-close and 5, Westmoreland-buildings, area 5,060 ft., f. 9,900
Fleet-st.—9, Salisbury-sq., f., r. 130*l.* £3,900
Fulham.—179 to 185 (odd), Lillie-rd., u.t. 78 yrs., g.r. 26*l.*, r. 217*l.* 4s. 2,410
Fulham-rd., i.g.r. 40*l.*, u.t. 58 yrs., g.r. nil. 820
Holloway.—Hollingsworth-st., i.g.r. 45*l.*, u.t. 45 yrs., g.r. nil 800
Bromley-by-Bow.—Reeves-rd., &c., i.g.r. 92*l.* 10s. u.t. 63½ yrs., g.r. 5*l.* 1,620

By BEARD & SON.

Brompton.—24, Halsey-st., u.t. 44¼ yrs., g.r. 7*l.*, r. 55*l.* 635
Peckham.—11, 13, and 15, Montpelier-rd., u.t. 61 yrs., g.r. 16*l.* 10s., r. 92*l.* 890

By DRIVERS (Holloway).

Finsbury Pk.—17, 18, 22 to 26, 29, and 30, Eade-rd., u.t. 86¼ yrs., g.r. 66*l.* 3s., r. 292*l.* 2,430
Holloway.—66, Hornsey-rd., u.t. 41 yrs., g.r. 5*l.* 5s., r. 25*l.* 210
Stamford Hill.—127 to 139 (odd), St. Ann's-rd., u.t. 71 yrs., g.r. 88*l.* 4s., r. 246*l.* 18s. 1,920
Holloway.—20 and 22, Roden-st., u.t. 62 yrs., g.r. 12*l.*, r. 64*l.* 615
Finsbury Pk.—37, Adolphus-rd., u.t. 75 yrs., g.r. 12*l.*, r. 52*l.* 10s. 470
43 and 45, Adolphus-rd., u.t. 74¼ yrs., g.r. 25*l.* 4s., r. 100*l.* 970
96 to 104 (even), 101 and 103, Finsbury Park-rd., u.t. 68 yrs., g.r. 60*l.* 18s., r. 297*l.* 2,890
Wood Green.—2, 5, 7, 9, and 11, Lawton-rd., u.t. 83 yrs., g.r. 28*l.* 15s. 695
Stamford Hill.—3, Henrietta-rd., u.t. 71 yrs., g.r. 6*l.* 10s. 160
St. Ann's-rd., &c., The Woodbury Works, u.t. 71 yrs., g.r. 17*l.* 17s., r. 30*l.* 150
St. Ann's-rd., &c., f.g.r. 17*l.* 17s., reversion in 71 yrs. 380

By BRADY & SON (at Manchester).

Wilmslow, Cheshire.—Overdale and 2 a. 1 r. 39 p., f. 2,725
Fitton's Farm, 33 a. 2 r. 14 p., f. 2,550
Cross Lane Farm, 21 a. 3 r. 14 p., f. 1,900
Moss Field and Colshaw Meadows, 24 a. 2 r. 18 p., f. 1,910

By HEPPER & SONS (at Leeds).

Leeds, Yorks.—13, St. John's-ter. 725

November 23.—By FURBER, PRICE, & FURBER.

Holborn, 9, Greville-st., f. 2,650
Clapham.—117 and 119, Larkhall-lane, u.t. 63 yrs., g.r. 15*l.*, r. 70*l.* 520

By D. L. GOOCH.

Dalston.—81, Wilton-rd., u.t. 63 yrs., g.r. 8*l.*, e.r. 50*l.*, with goodwill 450

By H. N. NEWTON & CO.

Brockley.—Chalsey-rd., i.g.r. 36*l.* 15s., u.t. 96 yrs., g.r. 10*l.* 600
Upton Park.—7, 8, and 9, Gurney-ter., u.t. 98 yrs., g.r. 24*l.*, r. 108*l.* 840

By SEAGRAVE, BROWETT, & TAYLOR.

Pimlico.—251, Vauxhall Bridge-rd., u.t. 26 yrs g.r. 5*l.*, r. 85*l.* 920
Marylebone.—Little Grove-st., i.g.r. 82*l.* 5s., u.t. 23 yrs., g.r. 35*l.* 10s. 525
Chelsea.—Wellington-st., &c., i.g.r. 22*l.* 10s., u.t. 8½ and 17½ yrs., g.r. 7*l.* 10s. £100
Enfield.—1, 2, 3, and 4, Assam-ter., also Assam House, u.t. 83 yrs., g.r. 20*l.* 10s., r. 123*l.* 12s. 1,050

By FLEURET, SONS, & ADAMS.

Swanley, Kent.—Station-rd., i.g.r. 7*l.* 10s., u.t. 69 yrs. 175
Paddington.—Cirencester-st., "The Spotted Dog" p.-h., a freehold rental of 100*l.*, reversion in 39 yrs. 4,500
Holloway.—Marlborough-rd., "The Prince Alfred" p.-h., a freehold rental of 100*l.*, reversion in 64 yrs. 3,700
Notting Hill.—Clarendon-rd., "The Britannia" p.-h., a freehold rental of 100*l.*, reversion in 32¾ yrs. 4,120
Caledonian-rd.—Freeling-st., "The Marquis of Salisbury," an improved rental of 78*l.*, u.t. 51 yrs. 1,900
Paddington.—Cirencester-st., "The Princess of Wales" p.-h., &c., improved rentals of 159*l.* 10s., u.t. 29½ yrs., with reversion for 24 yrs. 4,600
Hampstead.—Fleet-rd., "The Stag" Tavern, improved rental of 70*l.* for 40 yrs., with reversion for 12 yrs. 2,820

By A. G. NOTLEY (at Lowestoft).

Lowestoft, Suffolk.—Carlton-rd., &c., 66 plots of building land, f. (in lots) 5,028
10 and 11, Alma-rd., f., r. 26*l.* 12s. 510
19, 20, and 21, North Union-pl., f., r. 36*l.* 495

By HEPPER & SONS (at Holbeck.)

Holbeck, Yorks.—85, 87, and 89, Sweet-st.; 1, 3, and 5, Dudley-st., and 1 and 2, Lindley's-yd., f., r. 69*l.* 1s. 1,175
16 to 22 (even), Spa-st., and 1 and 2, Fourth-ct., f. 600

By EDWARD MITCHELL (at Hayle).

Phillack, Cornwall.—Barr View Farm, 64 a. 0 r., 15 p., f. 3,050
Penpol Farm, 45 a. 0 r. 21 p., f. 2,750
Penpol House and 10 a. 3 r. 39 p., f., r. 60*l.* 1,810
Hallankean Tenement and 3 a. 0 r. 5 p., f. 425
Three freehold fields, 9 a. 3 r. 30 p. 1,100
Hayle, Cornwall.—Various enclosures, 18 a. 3 r. 17 p., f. 1,736
1 and 2, Prospect-pl., f. 273
3, 4, and 10, Meadow-row, f., and lifehold 210
1 to 9 and 15 to 19, Mill-row, lifehold 1,052

November 24.—By DYER, SON, & HILTON.

Euston-rd.—128, Judd-st., u.t. 7¼ yrs., g.r. 45*l.* 10s., r. 148*l.* 170

By FAREBROTHER, ELLIS, & CO.

Whitechapel.—14, Whitechapel-rd., area 1,836 ft., f., r. 120*l.* 2,560

By C. C. & T. MOORE.

Mile End.—12, Lombard-st., u.t. 73 yrs., g.r. 12*l.* 800
82, Pelham-st., u.t. 73 yrs., g.r. 11*l.* 625
Stepney.—182 and 184, Oxford-st.; 30, Rutland-st.; 31a, Smith-st.; 17, Newark-st.; and 13, Walden-st., u.t. 2¼, 8, 9, and 15 yrs., g.r. 16*l.* 1s. 3d. r. 135*l.*

Paddington.—190, 192, and 194, Harrow-rd., u.t. 44 yrs., g.r. 30*l.*, r. 195*l.* £1,520

By DOUGLAS YOUNG & CO.

Bayswater.—37, Alexander-st. (with off license), a profit rental of 140*l.* for 52 yrs. 2,750

Clapham.—65, Jeffrey's-rd., u.t. 68 yrs., g.r. 7*l.* 10s., r. 45*l.* 460

Brixton.—7, Overton-rd., u.t. 63½ yrs., g.r. 10*l.* 10s. 450

By STIMSON & SONS.

Barnet, Herts.—190, 192, and 194, High-st., f., r. 70*l.* 1,325

Hackney.—9, Duncan-rd., and 1 to 8, Duncan-sq., f. 1,830

Dulwich.—33 and 35, Tyrrell-rd., f., r. 56*l.* 930

138 to 148 (even), Melbourne-gr., u.t. 78 yrs., g.r. 39*l.*, r. 198*l.* 1,545

Camberwell.—99 and 101, Denmark-rd., u.t. 26 yrs., g.r. 6*l.* 15s. 380

Dalston.—21, Salisbury-rd., u.t. 58½ yrs., g.r. 5*l.* 18s., r. 36*l.* 375

Peckham.—39, Montpelier-rd., u.t. 60½ yrs., g.r. 5*l.* 14s. 290

Wandsworth.—13 and 15, Gorst-rd., u.t. 82 yrs., g.r. 15*l.*, r. 80*l.* 810

66 and 68, Belleville-rd., u.t. 77 yrs., g.r. 12*l.*, r. 62*l.* 645

Battersea.—16, 18, and 18a, Ingrave-st., r. 110*l.* 10s., also l.g.r. 7*l.*, u.t. 51 yrs., g.r. 68*l.* 780

Old Kent-rd.—26 to 34, Grainger-st., u.t. 46 yrs., g.r. 60*l.* 440

By NEWBON, EDWARDS, & SHEPHARD.

Balls Pond.—62, 63, and 64, Stanley-rd., part f. and part u.t. 53 yrs., g.r. 1*l.* 11s. 6d., r. 84*l.* .. 1,470

Clapton.—4, Downs-rd., f., e.r. 45*l.* 610

Hoxton.—260, Hoxton-st., f., r. 35*l.* 1,000

1 to 7, Barrett's-bdgs., f. 655

De Beauvoir Town.—32, 34, and 36, Enfield-rd., u.t. 26 yrs., g.r. 13*l.* 10s., r. 108*l.* 815

Stoke Newington.—166, 168, and 170, High-st., u.t. 52 yrs., g.r. 60*l.*, r. 280*l.* 4,350

Clapton.—1, 3, 9, and 11, Rendlesham-rd., u.t. 40¾ yrs., g.r. 24*l.*, r. 131*l.* 1,055

Dalston.—7, Navarino-rd., u.t. 62 yrs., g.r. 10*l.*, r. 36*l.* 530

Hornsey.—177, Ferme Park-rd., u.t. 98 yrs., g.r. 10*l.* 5s., e.r. 60*l.* 595

230, 232, 236, 238, and 240, Ferme Park-rd., u.t. 98½ yrs., g.r. 47*l.* 5s., r. 237*l.* 2,435

Islington.—253, Essex-rd., u.t. 46¾ yrs., g.r. 6*l.* 10s., e.r. 50*l.* 480

Bloomsbury.—9, Caroline-pl., u.t. 17¾ yrs., g.r. 45*l.*, r. 75*l.* 250

By C. C. & T. MOORE.

St. George's East.—1 to 13, White Thorn-pl., u.t. 56½ yrs., g.r. 35*l.* 575

By H. CUTHBERT WILLIAMS (at Ely).

Coveney, Cambs.—Brown's Close, with two cottages, area 5 a., f., r. 28*l.* 320

By TUCKETT & SON (at Forest Gate).

Forest Gate.—Halley-rd., &c., 84 plots of building land, f. (in lots) 7,276

November 25.—By FIELD & SONS.

Dockhead.—London-st., &c., two warehouses and two plots of land, area about 18,884 ft., f. 9,500

Bermondsey.—71, Bermondsey-st., f., r. 50*l.* 910

51, Esmeralda-rd., u.t. 40¾ yrs., g.r. 6*l.*, r. 60*l.* .. 680

Peckham.—35 to 45 (odd), Bell's Garden-rd., u.t. 64½ yrs., g.r. 24*l.*, r. 143*l.* 910

Anerley.—28, Jasmine-grove, f., r. 34*l.* 505

Islington.—10, Compton-ter., u.t. 18½ yrs., g.r. 5*l.* 5s., r. 40*l.* 310

November 26.—By C. R. MORRIS, SONS, & PEARD (at Taunton).

Churchstanton, Somerset.—Oatens and Carter's Farm, 71 a. 3 r. 22 p., f. 855

Acombe Holding, 5 a. 0 r. 8 p., f. 155

November 28.—By ELLIOTT, SON, & BOYTON.

Regent-st.—Nos. 133 and 135, i.g.r. 187*l.*, u.t. 21 yrs., g.r. 67*l.* 1,900

Peckham.—98, Rye-lane, u.t. 76 yrs., g.r. 51*l.* 5s., r. 185*l.* 2,730

City of London.—81, Aldersgate-st., f., r. 200*l.* .. 4,880

38, Bartholomew-close, f., r. 50*l.* 1,220

Soho.—46, Dean-st., f., r. 260*l.* 5,250

171, Wardour-st., f., r. 100*l.* 2,500

Marylebone.—30, New Cavendish-st., u.t. 33½ yrs., g.r. 27*l.*, r. 150*l.* 1,650

Oxford-st.—10, Duke-st., u.t. 17 yrs., g.r. 110*l.*, r. 220*l.* 400

By HOLCOMBE, BETTS, & WEST.

Fulham.—Parsons Green-lane, f.g.r. 15*l.*, reversion in 15 yrs. 820

Paddington.—58, 73, 75, and 77, Waverley-rd., u.t. 51 yrs., g.r. 20*l.*, r. 140*l.* 1,200

By ROBSON & PERRIN.

Finsbury Pk.—15, 17, 19, 23, 25, and 27, Reginard., f., r. 216*l.* 3,100

60, 62, 68, and 70, Charteris-rd., u.t. 28 yrs., g.r. 17*l.* 4s., r. 104*l.* 730

24, 25, 26, and 27, Hatley-rd., u.t. 67 yrs., g.r. 20*l.*, r. 108*l.* 990

Stroud Green.—30, Ferme Park-rd., u.t. 80 yrs., g.r. 10*l.*, e.r. 65*l.* 680

35, Osborne-rd., u.t. 75½ yrs., g.r. 7*l.*, r. 42*l.* .. 460

Holloway.—25, Benwell-rd., u.t. 65 yrs., g.r. 8*l.*, r. 40*l.* 425

By ROGERS, CHAPMAN, & THOMAS.

City of London.—London Wall, f.g.r. 300*l.*, reversion in 70 yrs. 10,600

Battersea.—23, Church-rd.; also Park Cottage, f. 28 and 46, Sheepcote-lane, f. 730

Sheepcote-land, f.g. rents 23*l.*, reversions in 76 and 77 yrs. 475

Fulham.—85, 87, and 89, Rylston-rd., u.t. 60 yrs., g.r. 3*l.* 593

Walthamstow.—25 and 27, North-rd., f., r. 39*l.* .. 320 380

By WEATHERALL & GREEN.

Notting Hill.—14, Kensington-pl., u.t. 51 yrs., g.r. 6*l.*, r. 36*l.* 410

Stockwell.—56, Andalus-rd., u.t. 76½ yrs., g.r. 6*l.* 6s., r. 30*l.* 255

Poplar.—34 and 36, West India Dock-rd., u.t. 14 yrs., g.r. 18*l.* 10s., r. 55*l.* 150

***Contractions used in these lists.*—F.g.r.** for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard, &c.

PRICES CURRENT OF MATERIALS.

TIMBER.		
Greenheart, B.G. ton	8/0/0	0/0/0
Teak, E.I....load	10/10/0	15/10/0
Sequoia, U.S.ft.cu.	1/9/0	2/-/0
Ash, Canada, load	3/17/6	5/5/0
Birch, do.	3/0/0	5/0/0
Elm, do.	4/12/0	5/15/0
Fir, Dantsic, &c..	2/0/0	4/0/0
Oak, do.	3/5/0	3/15/0
Canada	4/0/0	6/-/0
Pine, Canada red	0/0/0	0/0/0
Do. yellow	4/7/6	6/5/0
Lath, Dantsic,fath	4/10/0	5/10/0
St. Petersburg..	4/0/0	6/10/0
Wainscot, Riga, &c., log.....	3/15/0	5/15/0
Odessa, crown....	3/15/0	5/15/0
Deals, Finland 2nd & 1st std 100	9/15/0	10/5/0
Do. 4th & 3rd ..	9/15/0	10/5/0
Do. Riga	8/5/0	9/5/0
St. Petersburg, 1st yellow	11/15/0	14/5/0
Do. 2nd yellow.	10/15/0	12/5/0
Do. white.....	9/5/0	11/5/0
Swedish	9/5/0	16/5/0
White Sea	10/5/0	17/10/0
Canada, Pine 1st	18/0/0	24/10/0
Do. do. 2nd	13/0/0	16/10/0
Do. do. 3rd, &c.	6/0/0	9/10/0
Do. Spruce, 1st	8/10/0	10/10/0
Do. do. 3rd and 2nd	7/0/0	8/10/0
New Brunswick	7/0/0	8/0/0
Battens all kinds	5/0/0	16/0/0
Flooring boards, sq., 1 in. prep. 1st.....	9/0	16/3
Do. 2nd	8/3	13/0
Other qualities—	6/6	7/0
Cedar, Cuba, ft.	/4	/4½
Honduras, &c.	/3½	/4½
Mahogany, Cuba	/5½	/7
St. Domingo, cargo av.	/5	0/1/3
Mexican, do. do.	/3½	/4
Tobasco, do. do.	/4	/6½
Honduras, do.	/4	/6
Box, Turkey, ton	4/0/0	15/0/0
Rose, Rio	7/0/0	14/0/0
Bahia	6/0 0	12/0/0
Satin St. Doming.	0/0/5	0/1/0

TIMBER *(continued)*.		
Satin, Porto Rico	0/0/9	0/2/0
Walnut, Italian ..	0/0/3	0/0/7
METALS.		
Iron—Pig, in Scotland .....ton	2/9/0½	0/0/0
Bar, Welsh, in London	6/0/0	6/5/0
Do. do. at works in Wales	5/15/0	5/17/6
Do. Staffordshire, in London.....	6/5/0	7/10/0
COPPER — British cake and ingot	59/0/0	59/10/0
Best selected ..	59/10/0	60/0/0
Sheets, strong..	63/10/0	65/0/0
Chili bars	55/0/0	0/0/0
YELLOW MTL.lb.	5d.	5⅝d
LEAD — Pig Spanish ....ton	13/7/6	0/0/0
English com. bands	13/12/6	0/0/0
Sheet, English 6 lbs. per sq. ft. and upwards ..	14/12/0	0/0/0
Pipe.....	15/2/6	0/0/0
ZINC — English sheet.....ton	28 0/0	0/0/0
Vieille Montagne	29/15/0	0/0/0
Spelter	24/0/0	24/5/0
TIN—Straits	82/5/0	0/0/0
Australian.....	82/15/0	83/5/0
English Ingots..	85/0 0	86/0/0
Banca	0/0/0	0/0/0
Billiton	0/0/0	0/0/0
OILS.		
Linseed .....ton	16/2/6	0/0/0
Cocoanut, Cochin	27/15/0	0/0/0
Do. Ceylon	24/10/0	0/0/0
Palm, Lagos	21/15/0	0/0/0
Rapeseed, English pale	23/0/0	0/0/0
Do. Brown	21/10/0	0/0/0
Cottonseed ref. ..	15/0/0	16/0/0
Oleine.....	17/0/0	18/0/0
Lubricating U.S.	0/5/3	0/7/6
Do. Black	0/5/0	0/6/6
TAR — Stockholm barrel	1/5/0	0/0/0
Archangel.....	0/18/0	0/0/0
Turpentine	29/0/0	0/0/0

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays.* N.B.—We cannot publish Tenders unless authenticated by the name and address of the sender; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is given, nor any list in which the lowest Tender is under £100 unless in some exceptional cases and for special reasons.]

BRIGHTON.—For erecting a manual instruction centre, Circus-street, Brighton. Messrs. Thos. Simpson & Son, architects, 17, Ship-street, Brighton:—

G. N. Lockyer £2,765	0	Lattin & Evershed £2,682	10
W. A. Field & Co. 2,743	15	W. A. Brown & Son .. 2,559	0

[All of Brighton].

BROMLEY (Kent).—For additions, &c., to hospital, Skym Corner, for the Bromley and Beckenham Joint Hospital Board. Mr. John Ladds, architect, 7, Doughty-street, London, W.C. Quantities by Mr. Alfred Boxall, 8, Adam-street, Adelphi, W.C.:—

R. J White & Sons £7,723	18 3	R. A. Lowe £6,723	0 0
Wallis & Sons 7,393	0 0	L. Evans 6,711	0 0
The General Builders 7,370	0 0	Pryer & Co..... 6,707	8 0
Hutchings..... 6,921	0 0	T. D. Graty, Bromley* 6,299	0 0
Potter Bros. 6,886	11 0		

* Accepted.

CLIFDEN (Ireland).—For the extension of infirmary, sewerage, &c., for the Union Guardians. Mr. Jas. Perry, County Surveyor, Galway:—

William Baird.....	£608 11 6
(Drainage £227, plumbing £169, cooking £211.)	
Thomas & Taylor	198 10 0
(Cooking and washing-troughs only.)	
Maguire & Gatehell.....	563 0 0
(Cooking and laundry £241, drains and plumbing £322)	
T. W. Little, Dublin*	545 0 0
(Drains £189, cooking, laundry, plumbing, &c., £356.)	
Thos. McWilliams	360 0 0
(Drains, plumbing.)	
Thos. McWilliams, Clifden*	495 0 0
(Building alterations.)	
Geoffrey Emerson	920 0 0
(For all the work specified.)	
T. W. Little	1,070 0 0
(For all the work.)	

* Accepted.

DARTFORD HEATH.—For the erection of twelve cottages at Dartford Heath, Kent. Mr. St. Pierre Harris, architect and surveyor, 8, Ironmonger-lane, E.C., and Orpington, Kent:—

Rider & Son £4,096		T. Knight.....£3,880	
Stebbings & Pannett 3,938		J. Lonsdale 3,812	

DARTMOUTH.—For rebuilding the "Criterion" restaurant, The Quay, for Mr. J. C. Dawe. Mr. J. Arthur Brand, architect, 3, Victoria-road, Dartmouth. Quantities by Mr. Louis Jacob, 423, New Cross-road:—

T. Brown £1,349		J. Back £1,119	
R. T. Pillar 1,253		R. C. Pillar, Devonport*.. 1,110	
W. G. Row 1,200		* Accepted.	

ELGIN.—For the erection of a public hall, Drummuir. Mr. R. B. Pratt, architect, County Bank House, Elgin:—

Masonry.—Davidson, Huntly.....	£945
Carpentry.—Archibald, Huntly.....	
Plumbing.—Ross, Dufftown	
Slating—Taylor, Keith	
Plastering.—McKay, Keith	
Painting.—Garden & Ward, Dufftown	
Heating.—McKenzie & Moncur, Edinburgh	

HUDDERSFIELD.—For the erection of a villa, Botham Hall-road, Longwood. Mr. J. Berry, architect, 9, Queen-street, Huddersfield:—

Masonry.—Hirst, Firth & Co., Golcar	£910
Joinery.—L. Kettlewell, Lockwood	
Plumbing.—D. Taylor & Sons, Lockwood.....	
Plastering and Painting.—Wilson Armitage, Golcar	
Slating.—Messrs. Anderson, Milnsbridge	
Concreting.—John Cook, Little Royd	

KNUTSFORD.—Accepted for the erection of temporary hospital at workhouse, for the Bucklow Union Guardians. Mr. R. J. M'Beath, architect, Birnam House, Sale:—

G. Ginger, jun., Longsight £234	15 0

LEEDS.—Accepted for the erection of two shops, Land's-lane, for Messrs. Gibbs & Co. Messrs. W. Hill & Son, architects, 25, Park-square, Leeds:—

Masonry.—J. T. Wright, Leeds £1,370	0
Granite.—Bower & Florence, Aberdeen.....	182 13
Joinery.—H. Atkinson & Sons, Leeds	554 0
Slating.—Pickles Bros., Leeds	39 7
Plumbing.—E. Wooler, Leeds	166 0
Plastering.—I. W. Watson, Leeds.....	105 0
Painting.—Wales & Son, Leeds	24 5

LONDON.—Accepted for erecting twenty suites of flats, Blythe-road, Kensington, for Mr. H. B. McCabe. Mr. R. J. Worley, architect, 50, Lincoln's Inn-fields:—

W. Smith, Camberwell.....	£15,550

LONDON.—For the erection of staff laundry receiving room, Western Hospital, for the Metropolitan Asylumns Board. Messrs. A. & C. Harston, Architects:—

George Wade.....£195	0 0	Spencer, Santo, & Co., Ltd., Earlstreet, Westminster*£152	18 3
Barrett & Power .. 179	0 0		
R. Goodman & Sons 176	12 0	James Barnes 149	13 0

[Architects' estimate, £152.]

* Accepted.

LONDON.—Accepted for the erection of a detached residence at Denmark Hill, for Mr. G. J. Aucutt. Mr. C. E. Child, architect:—

W. D. Palmer.....	£2,650

LONDON.—Accepted for alterations and additions at Nos. 10, 12, 174, and 176, Denmark Hill. Mr. E. B. Ellis, architect:—

W. D. Palmer	£231

LONDON.—For enlargement of Block D, Telegraph Factory, Mount Pleasant, E.C., for the Commissioners of H.M. Works and Public Buildings:—

J. Mowlem & Co.....£13,517		B. E. Nightingale £11,867	
W. H. Lorden & Son .. 12,988		R. W. Pattinson & Sons 11,399	
H. H. Sherwin 12,894		Arthur E. Wilson, 1, The Pavement, Northwood, Middlesex (accepted).. 11,100	
R. A. Yerbury & Sons .. 12,489			
J. Chessum & Sons..... 12,283			

LONDON.—For the erection of billiard-room at the "King's Head," London, E. Mr. Herbert Riches, architect, 3, Crooked-lane, King William-street, London, E.C. Quantities supplied:—

Hawtrey £1,465		A. Webb £1,375	
Sheffield Bros. 1,398		T. Osborn & Sons* 1,340	
J. & H. Cocks..... 1,390		P. Hart 1,277	

* Accepted, shortest time.

LONDON.—For fittings to a shop, Upton-lane, Forest Gate, E. Mr. Herbert Riches, architect, 3, Crooked-lane, King William-street, London, E.C.:—

Parnall & Sons, Ltd. £344		A. Webb* £244	
A. B. Hill..... 255		* Accepted.	

LONDON.—Accepted for repairs to "The Woodman," North Woolwich. Messrs. Foulsham and Herbert Riches, architects, Bromley-by-Bow, E., and 3, Crooked-lane, E.C.:—

W. Harris	£190

LONDON.—For the erection and completion of eight detached villas, Spencer-road, Grove-park, Chiswick, W. Messrs. Palgrave & Co., architects, 28, Victoria-street, S.W.:—

Joseph Bennet. John-street, W.	£8,500

LONDON.—For extension of premises, Powis-street, Woolwich, for Messrs. Garrett & Co., Ltd. Messrs. Church, Quick, and Whincop, architects, Woolwich:—

Munday & Son £4,125		H. L. Holloway £3,832	
Balaam Bros. 3,930		Chapman 3,815	
Turtle & Appleton 3,833		Thomas & Edge*..... 3,794	

* Accepted.

LONDON.—For additions and alterations at "The Green Man," East Ham, E. Mr. Herbert Riches, architect, 3, Crooked-lane, King William-street, London, E.C. Quantities supplied:—

T. Welsh & Son £3 075		T. Osborn & Sons £2,960	
W. J. Maddison 3,050		P. Hart 2,948	
J. & H. Cocks..... 2,978		Sheffield Bros.* 2,785	

* Accepted.

LOSSIEMOUTH.—For building a dining hall, &c., Lossiemouth, N.B. Mr. R. B. Pratt, architect, Elgin:—

Masonry.—McPherson, Elgin.....	£1,097
Carpentry.—Ritchie & Son, Lossiemouth.....	
Plumbing.—Gordon & Son, Elgin	
Plastering.—Gray, Elgin	
Slating.—Murray, Lossiemouth.....	
Painting.—Forsyth, Elgin	
Ironwork.—Johnston & Co., Elgin	

MANSFIELD.—For alterations to shops, West Gate, Mansfield for Mr. William Linney. Messrs. Vallance & Westwick, architects Mansfield:—

Contract No. 1.

C. Vallance £103	0 0	C. G. Percival, Mansfield*.....£77	9 6
Vallance & Blythe .. 101	12 0		

Contract No. 2.

Vallance & Blythe....£287	0 0	C. G. Percival, Mansfield* £204	0 0
J. H. Allen 256	15 3		

* Accepted.

MANSFIELD.—For new printing works, Toothill-road, Mansfield, for Mr. James King. From plans, specification, &c., prepared by Messrs. Vallance & Westwick, architects, Mansfield:—

J. Greenwood £988	0	J. F. Price £830	0
J. H. Vickers, Limited .. 898	0	Vallance & Blythe..... 805	0
Ashley & Harvey 858	0	Fisher Bros. 790	0
Gilbert & Gabbitass 833	0	C. G. Percival, Mansfield* 748	10

* Accepted.

MANSFIELD.—For proposed eight cottages off Rosemary-lane Mansfield, for the Mansfield Co-operative Society, Limited. Messrs' Vallance & Westwick, architects, Mansfield:—

Brailsford & Son.....£2,690		Vallance & Blythe, Mansfield* £2,120	
J. Greenwood 2,583			
Gilbert & Gabbitass 2,450			

* Accepted—subject to deductions.

MANSFIELD.—For proposed two houses, Portland-street, Mansfield, for Mr. G. A. Fish. Plans, specification, and bill of quantities by Messrs. Vallance & Westwick, architects, Mansfield:—

H. Vickers £2,171	0 0	J. Greenwood £2,043	0 0
Gilbert & Gabbitass 2,154	0 0	Fisher Bros., Mansfield* 1,850	0 0
J. H. Vickers, Ltd. 2,128	11 2		

* Accepted—subject to deductions.

MANSFIELD.—For new schools, &c. Rosemary-lane, Mansfield for the Mansfield School Board. From plans and specifications and bill of quantities prepared by Messrs. Vallance & Westwick, architects, Mansfield:—

A. Eastwood £12,450		J. H. Vickers, Ltd.....£11,450	
J. Greenwood..... 12,200		Fisher Bros. 11,100	
H. Vickers 11,995		Gilbert & Gabbitass, Nottingham (accepted) 10,903	
J. F. Price 11,687			

MANSFIELD.—For sewering, levelling, metalling, kerbing, &c., Quarry-lane, Mansfield, for the Mansfield Corporation; from drawings and specification prepared by Mr. R. Frank Vallance, C.E. Borough Surveyor:—

J. F. Price £1,565	0 0	J. Lane & Son.....£1,326	0 0
J. Greenwood 1,494	0 0	J. Bradley..... 1,321	10 10
J. Hawley & Son .. 1,373	0 0	Fisher Bros..... 1,278	0 0
J. Ford 1,369	1 8	W. A. Vallance, Mansfield* 1,249	0 0
J. Tomlinson 1,268	12 9		

* Accepted.

MANSFIELD.—For the erection of conditioning stores, St. John's-place, Mansfield, for Mr. R. L. Jones. Messrs. Vallance & Westwick, architects, Mansfield :—

Brailsford & Son	£787 13 10	C. Vallance	£608 0 0
I. Greenwood	640 7 6	S. B. Frisby	582 9 6
Vallance & Blythe	640 0 0	C. G. Percival, Mansfield (accepted)	537 2 0
F. H. & J. W. Moore	632 5 10		

MANSFIELD.—For proposed house, West Hill-drive, and shop, Clumber-street, Mansfield, for Messrs. Wright Bros. Messrs. Vallance & Westwick, architects, Mansfield :—

Gilbert & Gabbatass	£1,205	Vallance & Blythe	£1,173
S. B. Frisby	1,187	C. G. Percival	1,147
Brailsford & Son	1,177	J. Greenwood, Mansfield*	1,126

* Accepted.

MANSFIELD.—For proposed two houses, The Park, Mansfield, for Mrs. W. J. Dean, from plans, quantities, and specification by Messrs. Vallance & Westwick, architects, Mansfield :—

J. H. Vickers, Ltd.	£1,780	A. G. Bell	£1,630
J. F. Price	1,750	Gilbert & Gabbitass	1,595
H. Vickers	1,700	Fisher Bros.	1,540
J. Greenwood	1,692	W. S. Cuddy, Mansfield*	1,492

* Accepted.

MARKET DRAYTON.—For the erection of vagrant wards at Market Drayton, Salop, for the Guardians. Mr. G. A. Craig, architect, Market Drayton :—

Wood & Son	£1,739 0 0	Wright & Sons	£1,645 0 0
Garratt	1,713 16 10	Healey, Market Drayton (accepted)	1,549 1 4
Matthews	1,688 0 0		
J. Harding	1,675 0 0		

For Heating Apparatus for the same.

Hughes, Market Drayton (accepted) £55 5

MARYPORT.—Accepted for rebuilding the "Victoria Vaults and Royal Oak" inn, for the Brewery Company, Limited. Mr. C. Eaglesfield, architect, Maryport :—

Building.—W. Marshall
Joinery.—J. Kendall
Slating.—T. Mandle
Plastering.—T. Kirk
Plumbing.—E. Graham
Painting and Glazing.—J. Gordon
} £2,500

[All of Maryport]

MUNDESLEY (Norfolk).—For proposed new Grand Hotel. Mr. H. J. Green, architect, 31, Gastle Meadow, Norwich :—

F. Bennett	£12,150 0	J. Hurn	£10,035 10
J. S. Smith	10,716 0	Kerridge & Shaw	9,589 0
J. Youngs & Son	10,660 0	Cornish & Gaymer, North Walsham*	9,600 3
G. Riches	10,591 0		
J. W. Collins	10,525 0		

* Accepted.

ORPINGTON. — Accepted for the execution of decorative repairs to private residence at Orpington. Mr. St. Pierre Harris, architect and surveyor, 8, Ironmonger-lane, E.C., and Orpington :—

Somerford & Son £142 10

ORPINGTON.—For the execution of repairs to properties situated in Wellington-road, Orpington. Mr. St. Pierre Harris, architect and surveyor, 8, Ironmonger-lane, E. C., and Orpington :—

Stebbings & Pannett	£126 0	W. R. Taylor	£114 10
E. R. Thorne	120 15	J. Lonsdale	112 10

RUABON.—For the erection of a house, Rhosllanerchrugog, for the School Board. Messrs. J. Morison & Son, architects, King-street, Wrexham :—

John Davies	£460	Jenkins & Jones, Johnstown, Ruabon (accepted)	£435

House only; no outbuildings.

SALFORD.—For new school in Grecian-street, for the Salford School Board. Mr. H. E. Stelfox, architect, 100, Mosley-street, Manchester. Quantities by the architect :—

C. H. Normanton	£11,728	W. Southern & Sons	£11,400
F. & E. Haynes	11,604	G. Macfarlane	11,400
Peters & Sons	11,561	Wilson & Toft	11,358
J. Byrom	11,516	R. Neill & Sons, Manchester (accepted)	10,950
J. Ramsbottom	11,422		

For Caretaker's House.

C. H. Normanton	£669	J. Ramsbottom	£666
Wilson & Toft	646	G. Macfarlane	596
Peters & Sons	645	I. Byrom	591
Southern & Sons	614	R. Neill & Sons*	575
F. & E. Haynes	614		

* Accepted.

C. B. N. SNEWIN

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SHOREHAM.—For the erection of a private residence and stables at Shoreham, Kent. Mr. St. Pierre Harris, architect and surveyor, 8, Ironmonger-lane, E.C., and Orpington, Kent :—

Hanscomb & Smith	£2 210	Somerford & Son	£2,053
J. Lonsdale	2,126	Wiltshire & Son	2,024

SUNBURY-ON-THAMES. — For the erection of a semi-detached villa at Sunbury-on-Thames, for Colonel Morgan, Phillimore-gardens, Kensington. Mr. Henry Hall, architect, 19, Doughty-street, Mecklenburgh-square, W.C. :—

Robinson & Francis, Ashford, Middlesex £1,185 18

SUTTON-IN-ASHFIELD. — For proposed alterations and additions to the New Cross Hotel, Sutton-in-Ashfield, for Messrs. J. Hole & Co., Newark-on-Trent. Plans, quantities, and specification prepared by Messrs. Vallance & Westwick, architects, Mansfield :—

C. F. Taylor	£1,156	Gilbert & Gabbitass	£795
J. H. Vickers, Ltd.	847	S. B. Frisby	780
Fisher Bros.	817	J. Keeling, Sutton-in-Ashfield (accepted)	650
J. F. Price	820		

WIDNES.—Accepted for the extension of the West Bank Promenade. Mr. J. S. Sinclair, C.E., Town Hall, Widnes :—

John Taylor, 3, Long-lane, Garston, Liverpool £3,500

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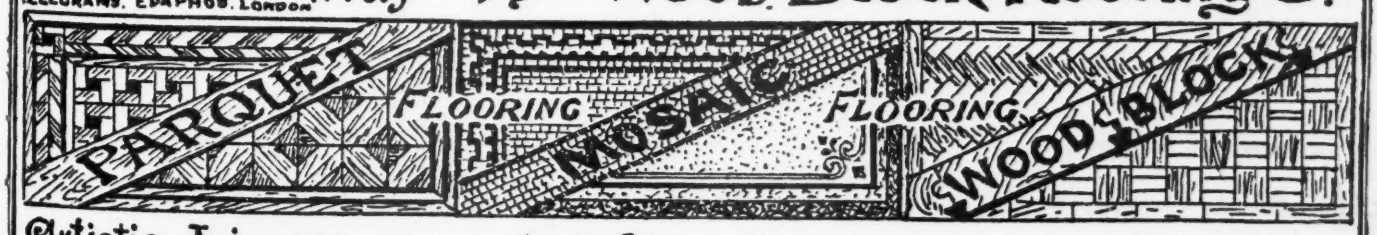

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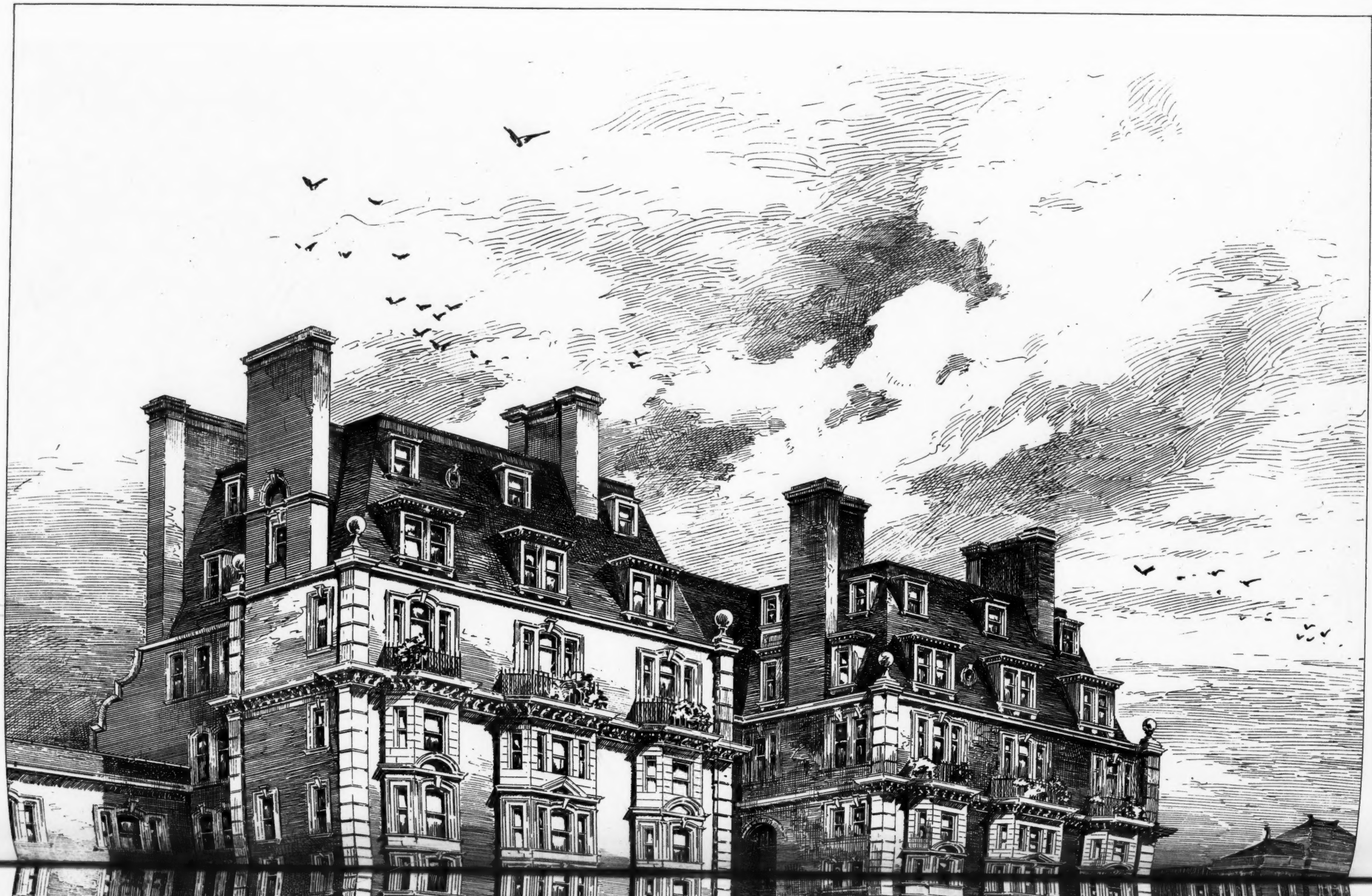

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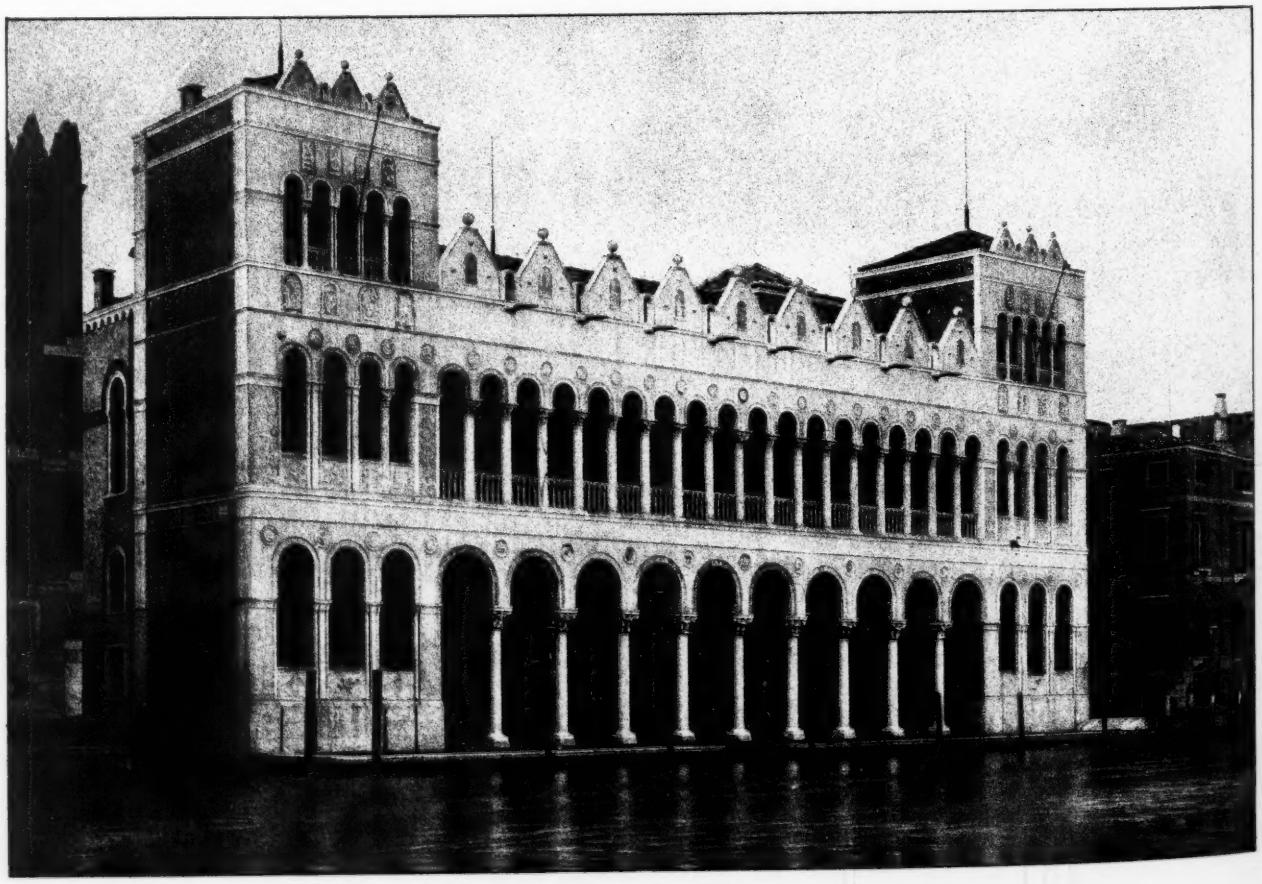

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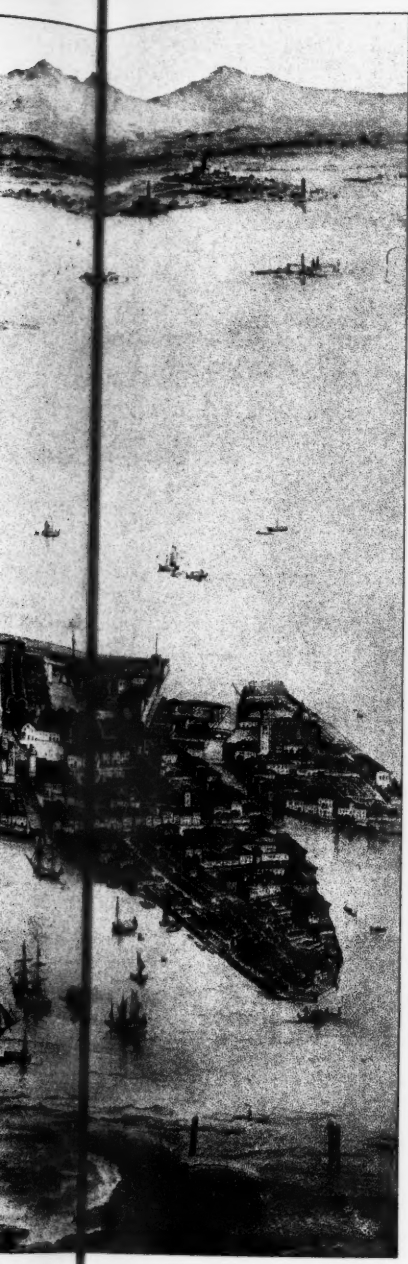

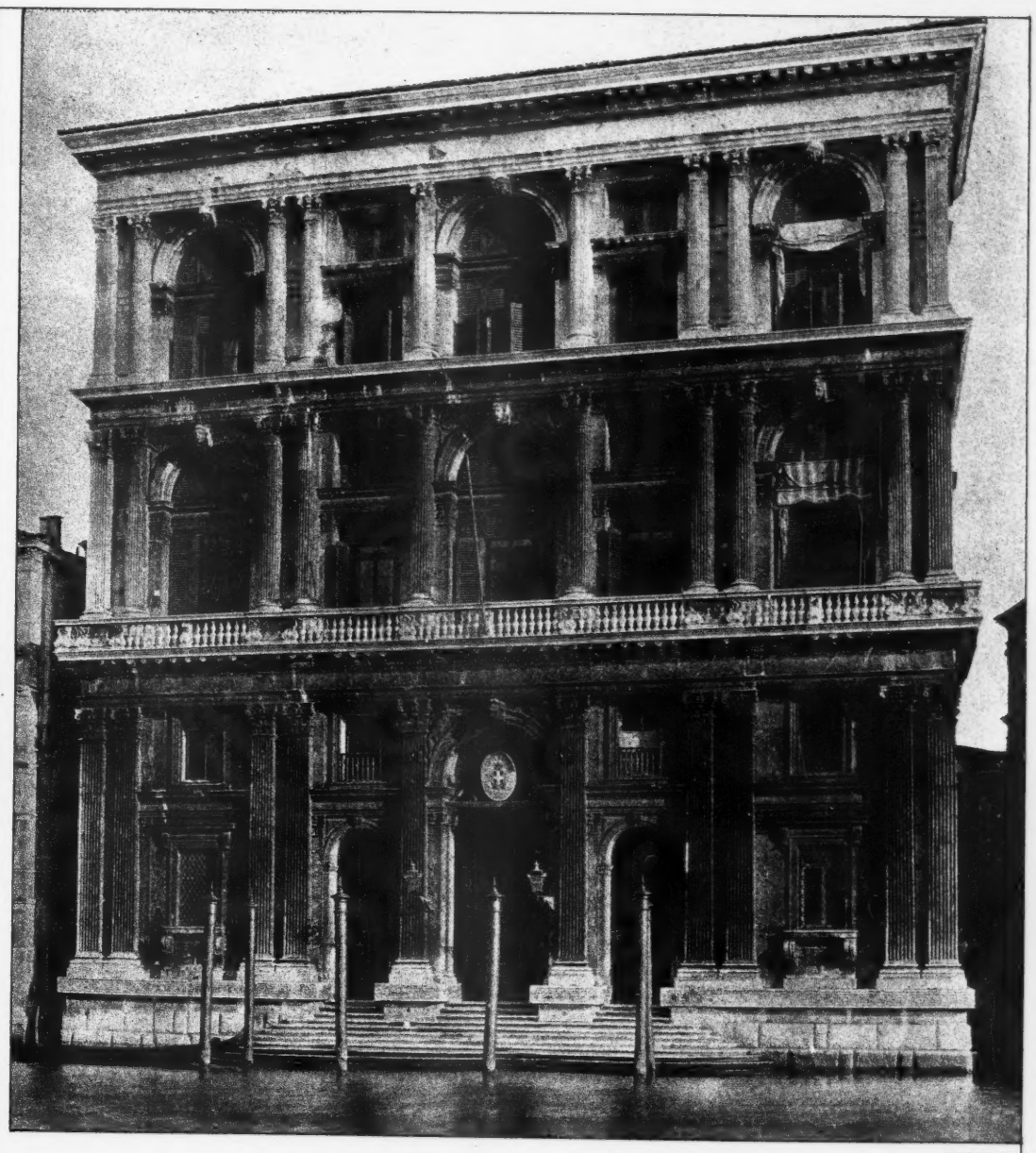

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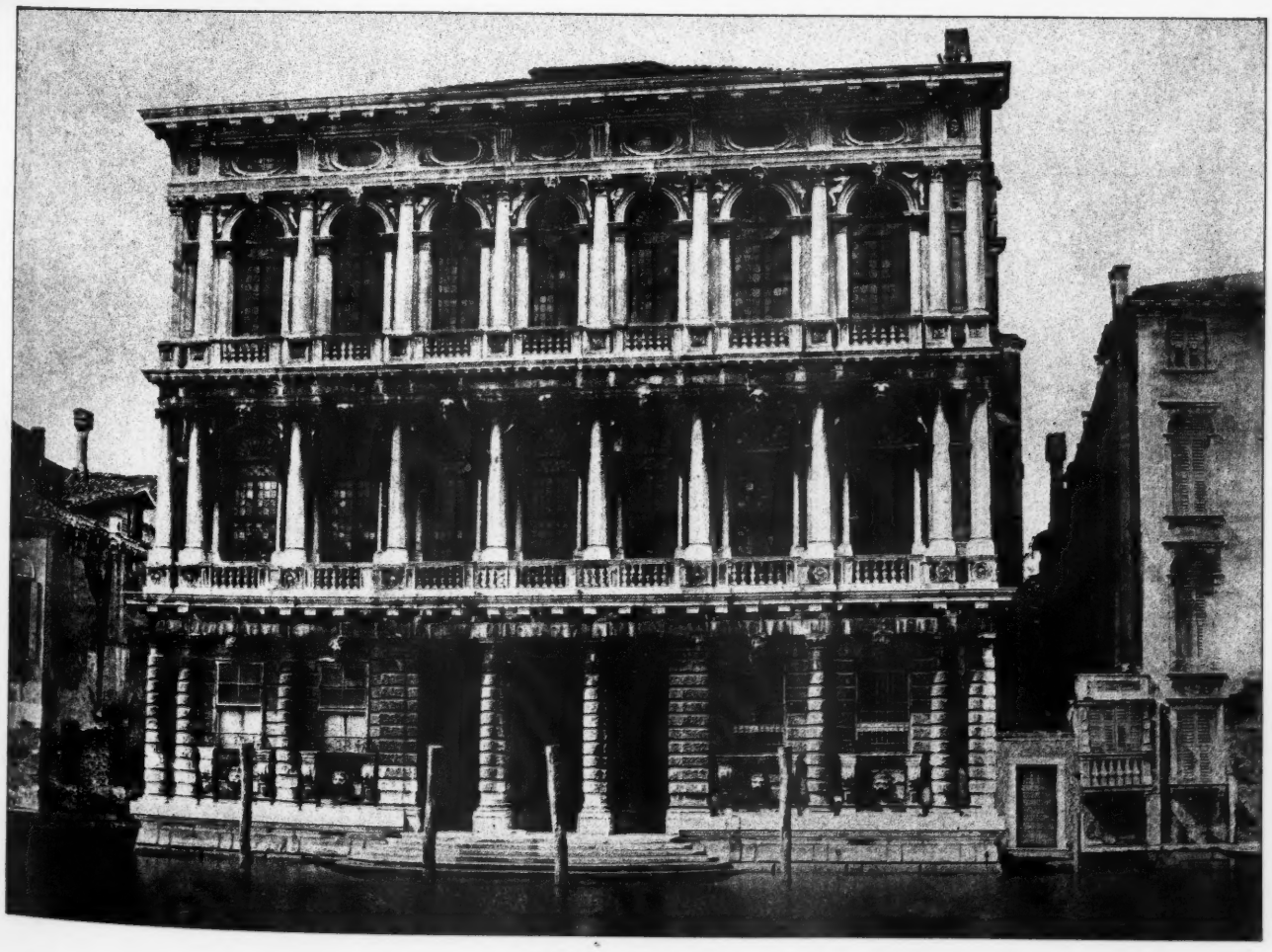

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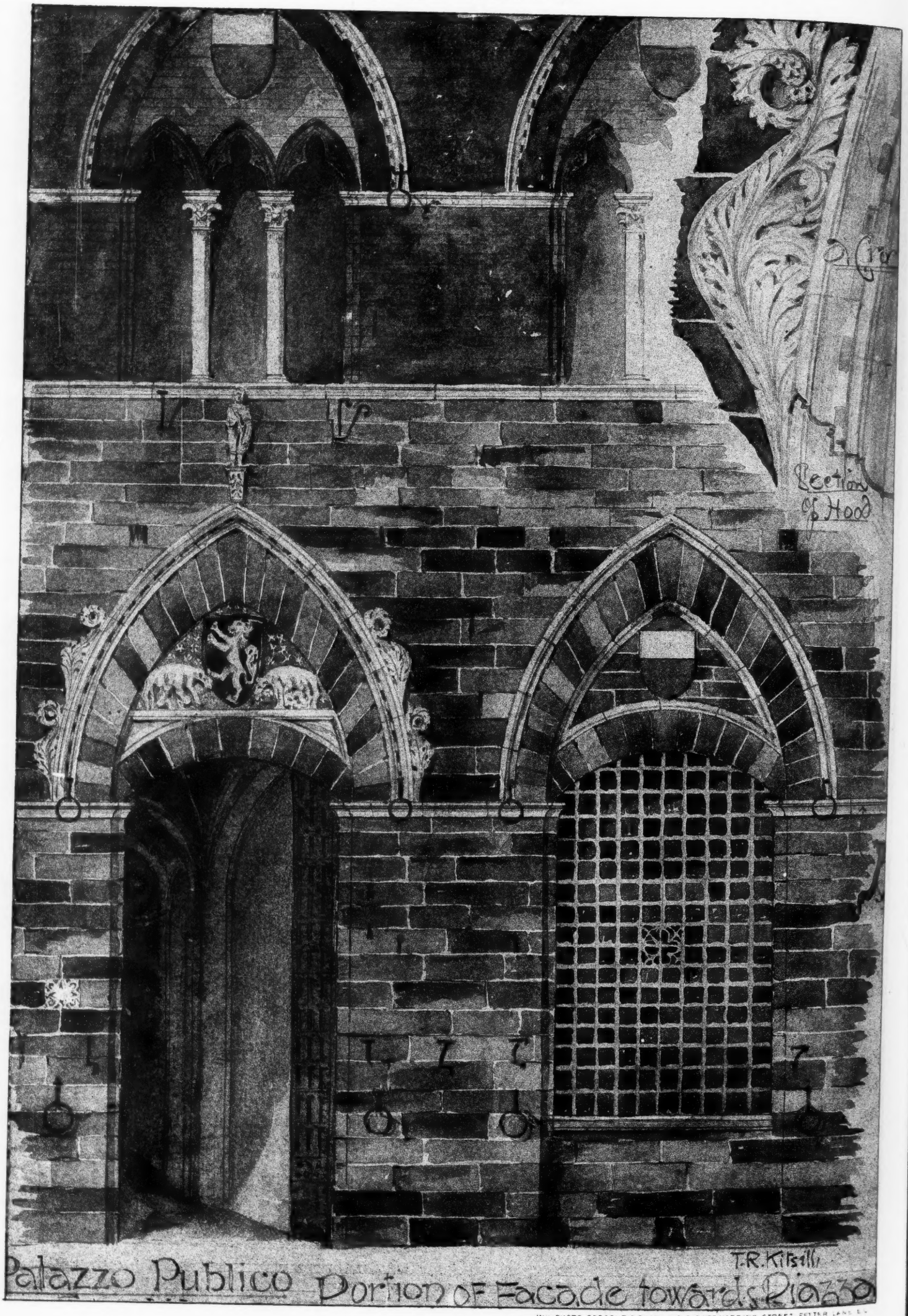

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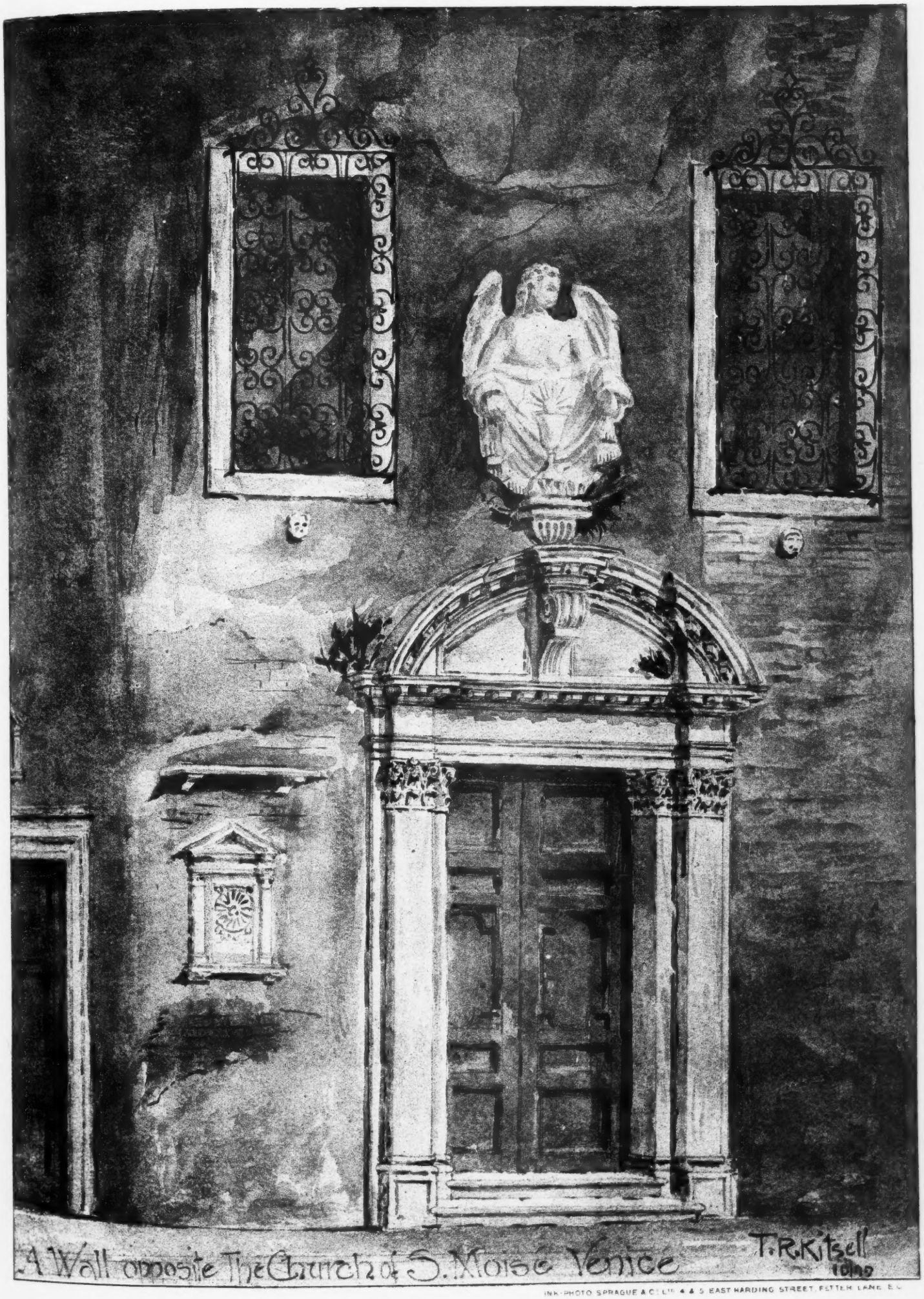

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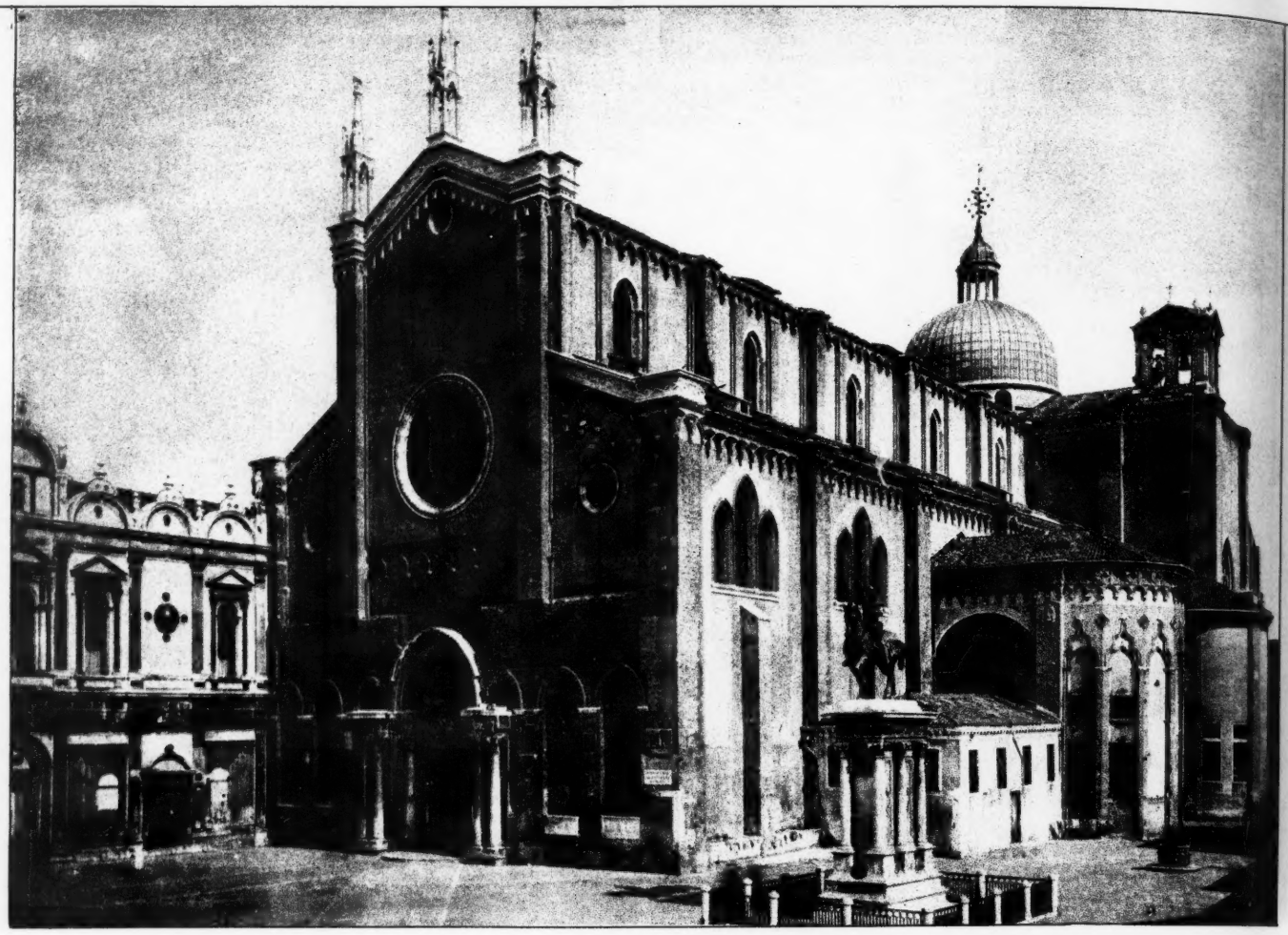

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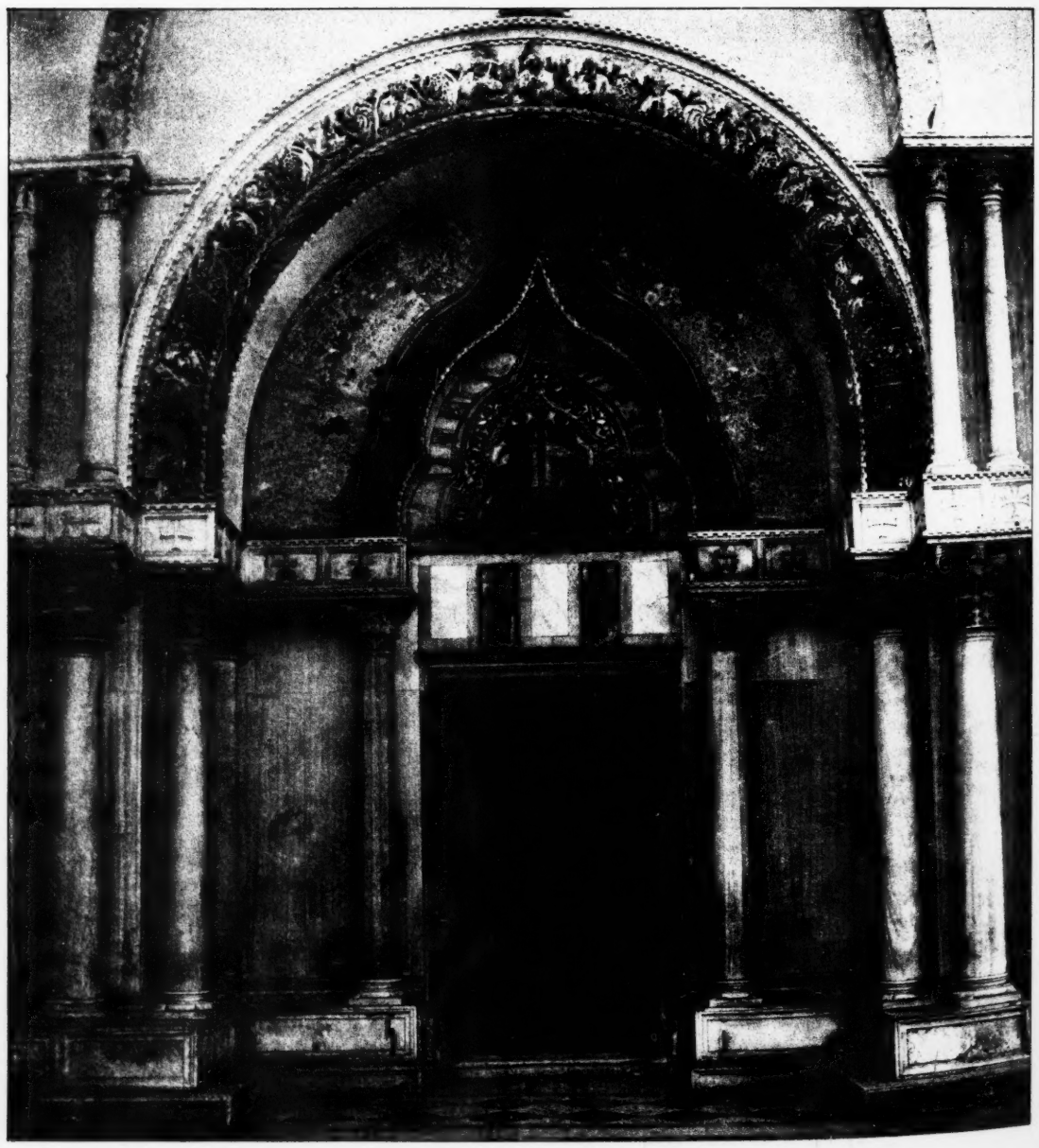

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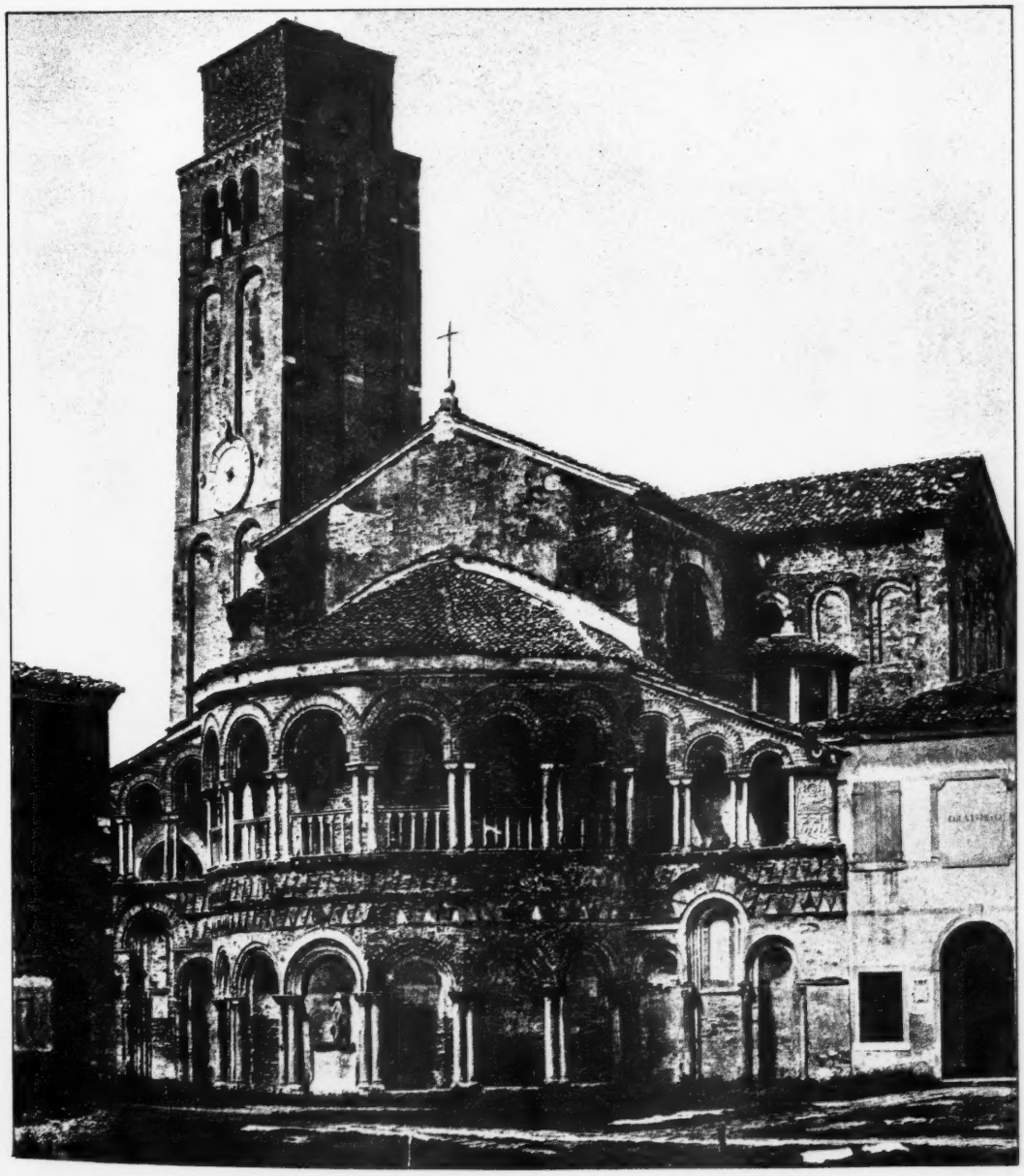

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